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BLUE JAY

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Poetry

HAIKUS. *Marianne B. Neily*..

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THE GARTER SNAKES: EVOLUTION AND ECOLOGY.
Reviewed by Francis R. Cook...
DEEP ECOLOGY FOR THE 21ST CENTURY. Reviewed by Bruce Noton..............
NOTICE...

EDITOR'S MESSAGE

Stephanie and I have moved to Calgary, Alberta. My new address is still in the Canad Prairies — an essential qualification for a *Blue Jay* editor — so I am pleased I will be abl remain as editor. As we have bought a house, authors can mail their submissions directl me at:

754 Woodpark Road S.W.
Calgary, AB
T2W 2S4

and our email is johnrs@cadvision.com and telephone (403) 251-5318.

Moving has cut deeply into our normal naturalist activities, yet there is some compensat My new office overlooks the Macleod Trail with its rush of traffic, to a woodlot beyond wh a pair of Swainson's Hawks has a nest and bring terror to the ground squirrels that along the road's margins. Our new house is a few blocks from Fish Creek Park, the loca of the Gottfred's wonderful study of Great Horned Owls (See *Blue Jay* 54: 180-184).

Two more people who deserve special acknowledgment are Mary Gilliland and A Leighton. Mary rushed to my help with her knowledge of material from the Saskat Nature Society's file. She selected the most appropriate articles, organised them and m up edited, electronic copies. This made my life much easier and helped get our maga back on schedule.

When I needed articles on plants Anna offered to help without hesitation. Her articles ar well written that neither I nor the reviewers have made any changes. The only time articles get touched by red ink is when I ask Anna to proof read an entire issue. She pr her own work as vigorously as any other. Think of these two fine ladies as you read issue.

Again I will appeal for material. I would appreciate more photographs that I can keep on to be used as needed, more photographs to be used for covers (single or double) colour photos for the centre of next September's issue. I am hoping my move to Alberta encourage more papers from this area and I would like to see an article or two ab Canada's great north.

I have been asked the identity of the fungi depicted in the fine photograph by George T on the front cover of the June issue of *Blue Jay*. Can anyone identify them?

Also, the albino mystery bird shown in December 1996 *Blue Jay* still remains a myst Perhaps the closest guess is a Brown-headed Cowbird? Any further comments suggestions?

Sincerely,

Roy D. John

BIRDS

PREY OF NESTING RED-TAILED HAWKS AND GREAT HORNED OWLS ON LOSTWOOD NATIONAL WILDLIFE REFUGE, NORTHWESTERN NORTH DAKOTA

ROBERT K. MURPHY, U.S. Fish and Wildlife Service-Des Lacs National
Wildlife Refuge Complex, 8315 Hwy 8, Kenmare, ND 58746

Nesting Red-tailed Hawks recently nvaded and Great Horned Owls iave increased on Lostwood Naional Wildlife Refuge (LNWR) in iorthwestern North Dakota due to succession from mixed-grass prairie o aspen parkland.[6] Information on liets of these raptors could help resource managers assess the speies' needs and relationships with ther fauna, but such data are availble from few areas in the northern Great Plains.[2,11] This paper summaizes composition of prey of Red-ailed Hawks and Great Horned Owls bserved at nests on LNWR during a ong-term study of raptor nesting cology.[6]

Study Area and Methods LNWR is 08 km^2 of rolling to hilly, semi-arid rassland interspersed with numerus temporary to permanent wetland asins and an average of about 12 lumps of Quaking (or Trembling) spen trees per 2.6-km^2 section. hysiography, geology, soils, habitat omposition, climate, and history of ie area have been described.[6]

I observed fresh (still edible) prey ems during climbs to assess reprouctive success at Great Horned wl nests during early May and at Red-tailed Hawk nests during late June, 1983-90. Prey were identified and left in nests. Data were pooled from all years for both raptor species and were summarized by relative (percentage) frequency.

Results and Discussion Forty-nine fresh prey were observed during about 200 climbs to Red-tailed Hawk nests and 53 fresh prey were observed during 78 climbs to Great Horned Owl nests. Although small prey were more likely to be overlooked than large prey by my methods, I assume effect of the bias was low. Birds were the most important prey of Red-tailed Hawks and especially of Great Horned Owls on LNWR (Table 1). Mammals generally comprise most Red-tailed Hawk prey during summer in other parts of the northern Great Plains[2,11] and elsewhere.[4] Nesting Great Horned Owls also tend to rely on mammals,[4] although birds apparently dominate diets of Great Horned Owls in south central North Dakota.[2] Rabbits and hares, important prey of Great Horned Owls in other north-central states and in adjacent provinces,[1,3,10] probably were not preyed on more often on LNWR because they were scarce in the area.[5]

Table 1. PREY OF RED-TAILED HAWKS DURING SUMMER AND OF GREAT HORNED OWLS DURING SPRING ON LOSTWOOD NATIONAL WILDLIFE REFUGE, NORTH DAKOTA, BASED ON OBSERVATION OF FRESH PREY AT NESTS, 1983-1990.

Prey[a]	Red-tailed Hawk		Great Horned Owl	
	number	% frequency	number	% frequency
Mammals				
Richardson's & Thirteen-lined ground squirrels	10	20.4	0	—
Meadow Vole and jumping mouse sp.	4	8.2	6	11.3
White-tailed Jackrabbit (juvenile)	1	2.0	5	9.4
Least Weasel	1	2.0	0	—
Total mammals	16	32.7	11	20.8
Birds				
Horned or Eared grebe	0	—	3	5.7
American Coot	2[b]	4.1	12	22.6
Sora and Virginia rails	0	—	2	3.8
Duck[c]	18[d]	36.7	14	26.4
Sharp-tailed Grouse	5[e]	10.2	5	9.4
Blackbird[f]	1	2.0	6	11.3
Unknown passerines (juveniles)	5	10.2	0	—
Total birds	31	63.3	42	79.2
Other prey				
Smooth Green Snake	1	2.0	0	—
Band-winged Grasshopper (*Oedipodinae*)	1	2.0	0	—
Total	49	100.0	53	100.0

[a] Prey were adult size unless otherwise indicated.
[b] Both coot prey were juveniles.
[c] Adult duck prey included Mallard, Northern Pintail, Blue-winged Teal, Northern Shoveler, Gadwall, American Wigeon, and Lesser Scaup.
[d] Duck prey of Red-tailed Hawk included nine juveniles.
[e] Grouse prey of Red-tailed Hawk included three juveniles.
[f] Blackbird prey of Red-tailed Hawk was Red-winged Blackbird. Blackbird prey of Great Horned Owl included Yellow-headed Blackbird, Common Grackle, and Brown-headed Cowbird.

Red-tailed hawk delivers meadow vole prey to its nestling on Lostwood National Wildlife Refuge, North Dakota

Robert K. Murphy

About 43% of Red-tailed Hawk prey and 64% of Great Horned Owl prey were species directly associated with wetlands, such as American Coot, ducks, and Yellow-headed Blackbird, even though wetland habitat comprised only 20% of LNWR. Thus, use of wetland-dependent prey by both raptor species was greater than expected based on the availability of wetland habitat. The most important prey groups were birds from wetlands (Table 1), especially American Coot for Great Horned Owls and ducks for both species of raptors. One-half of duck prey of Red-tailed Hawks were ducklings, all but one of these less than a week old. Female ducks made up 79% of 14 adult duck prey of Great Horned Owls. I did not estimate prey composition by biomass (weight) but believe wetland- dependent birds contributed most prey biomass used by nesting Great Horned Owls based on frequency of grebes, American Coot, and ducks observed. Wetland-dependent birds dominated biomass of the owl's diet on a nearby area of mixed land use.[8]

Another important prey group used by Red-tailed Hawks was ground squirrels (Table 1). Most (80%) were Richardson's Ground Squirrels that may have been captured on heavily grazed prairie adjacent to LNWR. Franklin's Ground Squirrels occurred on LNWR[5] but were not observed as prey of either Red-tailed Hawks or Great Horned Owls.

Overlap in the diets of co-existing Red-tailed Hawks and Great Horned Owls has been studied previously in North America, based on prey remains or pellets at nests.[2,4] However, a six-week disparity in nesting chronology between the two species on LNWR[7] rendered such comparisons weak. In summer nearly one-half of mammal and bird prey of Red-tailed Hawks were juveniles, but about the only juvenile vertebrate prey available in spring when Great Horned Owl diets were recorded were small (less than one-eighth grown) jackrabbits; the owls used this prey (Table 1). Great Horned Owls would have preyed on different age classes and perhaps species of prey during summer compared to spring, as they did on nearby areas of mixed land use.[8]

My cursory survey suggests birds, especially those from wetlands, are the most important prey of nesting Red-tailed Hawks and Great Horned Owls on LNWR during each raptor's respective nestling period. Great Horned Owls seemed particularly tied to wetland-dependent prey, which supports observations of a strong affinity for wetland habitats by the owl on LNWR.[6] Relative composition of Red-tailed Hawk and Great Horned Owl diets on LNWR were similar to those noted in south-central North Dakota[2] except that Red-tailed Hawks on LNWR relied more on bird prey, and ducks were more important to both the hawk and owl on LNWR.

Acknowledgments John Ensign and Karen Smith lent expert help in the field, and R.L. Eng and Alan B. Sargeant commented on a manuscript draft.

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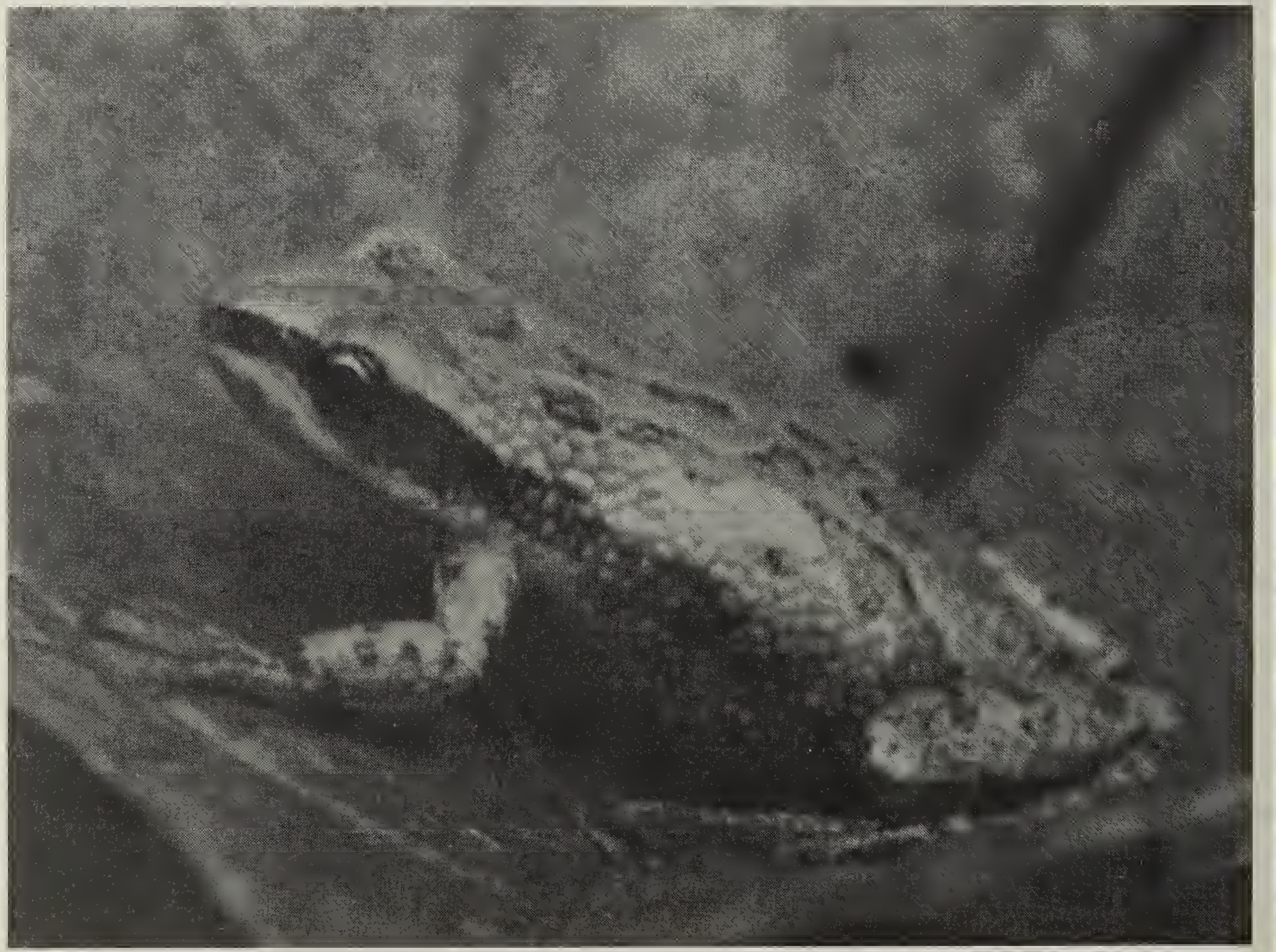


Boreal Chorus Frog *Wayne Lynch*

A TALE OF TWO KITTIWAKES

PETER TAYLOR, Box 597, Pinawa, MB R0E 1L0

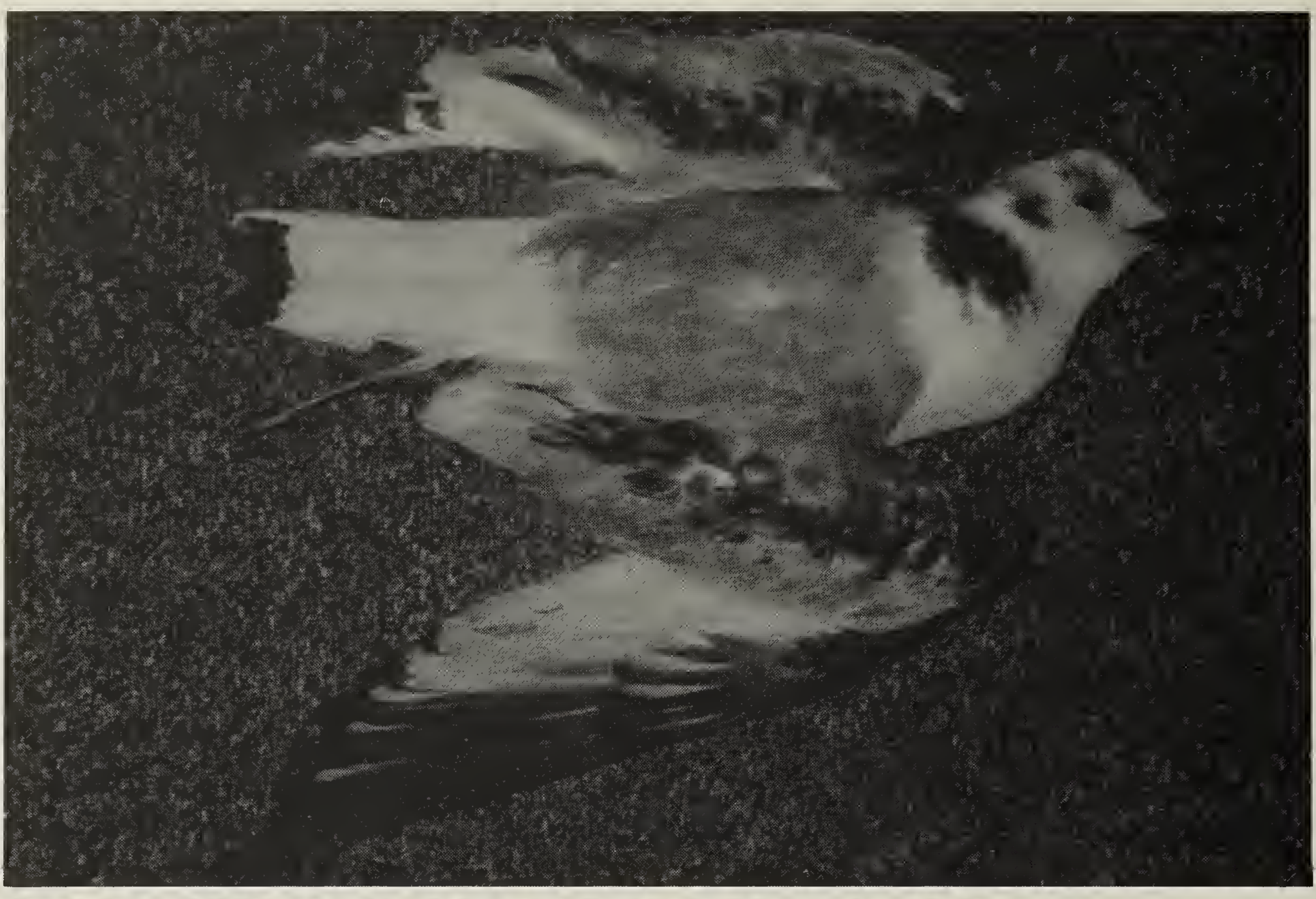
As the month of November progresses, fall migration draws to a close and birding opportunities in southern Manitoba diminish. The last places to look for migrants are along major rivers, where a few water birds linger well into November, and even early December. The stretch of the Winnipeg River near Pine Falls, just upstream from its mouth in Lake Winnipeg, has proven rewarding at this season in recent years. Therefore, I set out for Pine Falls with high hopes on 16 November 1996. A major blizzard in the forecast hinted that this might be the last day of fall, as birders know it.

There was entertainment along the way. I was amused by the antics of a Common Raven, which tweaked the wings and tail of an immature Bald Eagle that was feeding on a fox carcass near the highway. A Northern Hawk Owl gave a hint of the exceptional winter influx to come. When I finally reached the hydroelectric dam at Powerview, near Pine Falls, the river downstream was thronged with gulls. I estimated about 800 Herring Gulls in a restless flock that repeatedly took off from the river, climbed and headed south for a kilometre or so, then thought better and circled back and landed. It looked as though they would have to stay and weather the approaching storm. Careful scanning of the gull flock rewarded me with sightings of four Glaucous Gulls, one Thayer's Gull, and one Iceland (Kumlien's) Gull. Normally, any one of these would be a major highlight on a late fall day; to find such numbers was unprecedented.

I drove from place to place, trying different vantage points to check for other interesting birds, and managed to find straggling individuals of several grebe and duck species, including three Oldsquaws. All this was excitement enough, but I was hardly prepared for what lay ahead, literally, as I drove across the dam for about the fifth time. On the road in front of me was a smaller gull, evidently just struck by a vehicle. I quickly pulled over, ran back to check the casualty, and was amazed to find it was a first-winter Black-legged Kittiwake. Still warm and limp, it had been dead no more than a minute or two. Talk about mixed feelings, the excitement of discovery was mixed with sadness at this rare stray's freakish demise (not to mention the fact that it was not "countable" by the American Birding Association's rules!).

The specimen was in good condition, so I took it home and arranged to forward it to Dr. Spencer Sealy, who accepted it for the bird collection at the Zoology Department of the University of Manitoba in Winnipeg. A photograph of the kittiwake accompanies this article.

This bird was only the second Black-legged Kittiwake to be recorded in southern Manitoba. The first, also in first-winter plumage, was found on 25 November 1995 under even stranger, but happier circumstances. Joanne Manary discovered this bird resting on her vehicle in the parking lot of Stony Mountain Penitentiary, north of Winnipeg! It was easily caught, and was eventually forwarded to the animal hospital at



Black-legged Kittiwake found dead at Pine Falls Generating Station, Powerview, Manitoba on 16 November 1996 *Peter Taylor*

Winnipeg's Assiniboine Park Zoo. While in the zoo's care, the bird's identity was confirmed by Rudolf Koes on 3 December. After fattening up on goldfish, this lucky bird was flown to Vancouver to complete its recovery for eventual release.

The Black-legged Kittiwake is a cliff-nesting, sea-going gull that nests on northerly coasts of North America and Eurasia and winters mainly at sea. Small numbers occur regularly in the lower Great Lakes region, and the species is a rare wanderer elsewhere in the North American interior. In southern Ontario, for example, it occurs mainly between late April and late May, and from mid-September to late December.[2] In 1983, Smith and Kuyt compiled 15 records from the Prairie Provinces and nearby states.[8] All but three of these records were in fall or winter, mainly November and December, and most were first-winter birds. Smith and Kuyt speculated that such birds were displaced eastward by low pressure systems moving eastward out of the north Pacific.[8] A number of additional records, including those described here, fall into this pattern of late fall wandering by young birds.[1,3,7,8,10]

Two records in adjoining regions roughly coincide with the Pine Falls, Manitoba bird. Saskatchewan's third Black-legged Kittiwake was found near Gardiner Dam on 7 December 1996, and one was seen at Lake Winnibigoshish, Minnesota on 10 November 1996; both were first-winter birds.[6,9] The latter, however, may have been a rediscovery of a bird seen in September. Exceptions to the late-fall pattern of occurrence include the four or five birds seen at Churchill, Manitoba, most or all of them adults, in June or July.[4,5] These were most likely members of the Arctic breeding population that strayed into Hudson Bay. Alberta also boasts June and July sightings of this species.[1] The occurrence of several spring records in South Dakota and Minnesota indicates that the occasional Black-legged Kittiwake may also turn up in the Prairie Provinces in spring.[3,10]

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* * *

Gumbo Evening Primrose *Wayne C. Harris*

MID-CONTINENT PLATFORM NESTERS

DAVID C. VANDERBURGH, 125 Dunfield Ave., Dauphin, MB R7N 0P1

Osprey returning to nest with fish for two young *David Vanderburgh*

In the September 1993 issue of *Blue Jay*, "Manitoba Hydro Accommodates Osprey Activity," I described our platform-building methods for relocating Osprey nests on electrical distribution and transmission lines in parts of Manitoba.

Since that time, we have installed several more platforms and I have personally monitored the use and success of these sites. The results have been most gratifying, to say the least!

I have not personally observed any Osprey nests, other than on hydro lines, in these areas. However, I have had reports that a few "natural" nests do exist near lakes in the adjacent Duck and Porcupine Mountain areas. It appears to me that the birds prefer to nest on hydro structures, when available, rather than natural sites. This being the case, we have no means of determining what the fledgling rate would be if nest platforms were not available.

Table 1. MONITORED USE OF OSPREY NESTS/PLATFORMS ON HYDRO STRUCTURES IN PARTS OF CENTRAL AND NORTHERN MANITOBA

	1988	1989	1990	1991	1992	1993	1994	1995	1996
Number of nests/ platforms monitored	1	0	0	0	1	1	1	7	13
Number of fledglings observed	3				2	1	3	8	12

Newly installed platform c/w nest which the crew moved from the centre of the structure *David Vanderburgh*

However, given the observed number of fledglings as per Table 1, the Osprey population in these areas is certainly doing very well!

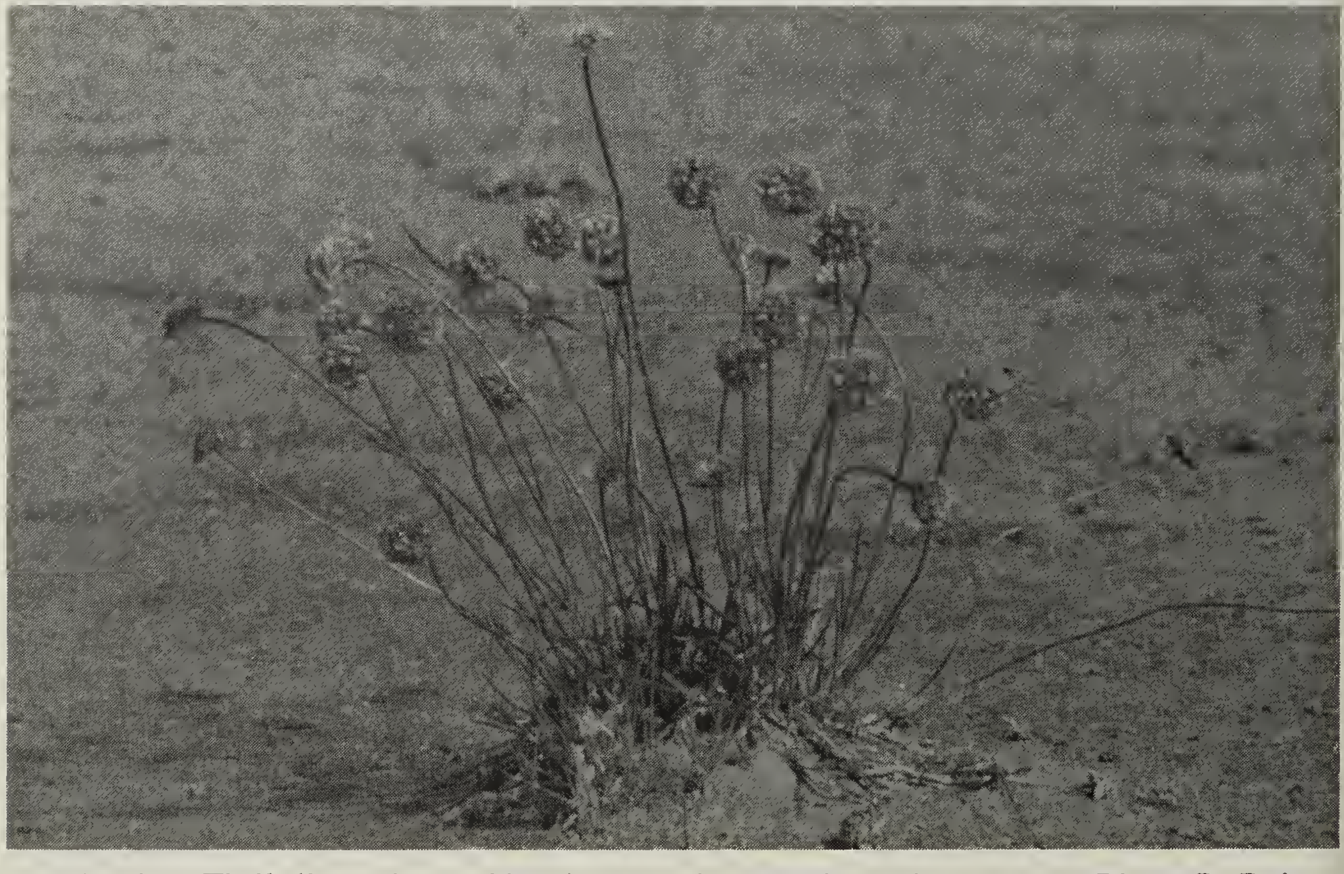
Since our data is relatively recent, I draw no long-term conclusions from our platform activities. However, it is certainly apparent that our efforts are making a contribution to the "mid-continent" Osprey population!

Moving the nest to the new platform *David Vanderburgh*

Manitoba Hydro crew installing a nest platform on energized 230,000 volt line near Dawson Bay on Lake Winnipegosis
David Vanderburgh

Another Manitoba Hydro crew installing a nest platform during replacement of a fire-damaged 25,000 volt structure on the shore of the Waterhen river
David Vanderburgh

◆



*Athabaskan Thrift (*Armeria maritima*), an endangered species* *Diane B. Robson*

SUMMER FLOCKS OF SANDHILL CRANES IN MANITOBA

PETER TAYLOR, P.O. Box 597, Pinawa, MB R0E 1L0

Sandhill Cranes form large flocks during migration and in winter, but summer flocks are apparently unusual.[1] This note describes several observations of summer flocks in Manitoba; localities are shown in Figure 1. Koonz reported a flock of Sandhill Cranes in a recently germinated grain field near Waterhen on 14-15 June 1989.[1] At least 112 adult cranes, which Koonz suggested were non-breeders, congregated in the field during the evening on the latter date.

In the late morning of 1 July 1993, I counted 108 Sandhill Cranes in a field of seedling grain (about 20 cm tall) and adjoining weedy canola, 35 km east of Ashern. In the early afternoon of the following day, I saw 64 Sandhill Cranes, again in a field of young cereal plants, south of the junction of provincial roads 282 and 283 (southwest of The Pas).

On 15 June 1981, I saw 45 Sandhill Cranes in a seedling grain field 5 km south-southeast of River Hills. Three days later, Dennis Fast and Harvey Lane accompanied me to the field and we counted 95 birds at 8 p.m. A visit at 8:30 p.m. on 26 June 1981, however, turned up only a few cranes. On 17 June 1990, I counted 70 Sandhill Cranes in seedling grain in the same area.

In summer 1992, a flock of Sandhill Cranes frequented canola fields along provincial road 317, 4 km northwest of Lac du Bonnet. When discovered at 10:00 a.m., 27 June 1992, 76 birds were seen. Later counts were 60+ at 1 p.m., 1 July; 45 at 8 p.m., July 10; 84 at 7:50 p.m., 14 July; 52 at 1:15 p.m., 16 July; 20 at 7:30 p.m., 22 July; and 24 on 25 July. By late July, the canola was almost tall enough to hide the cranes. None was seen at 7 p.m. on 5 August.

It is not unusual to see flocks of Sandhill Cranes in farmland in southeastern Manitoba in August; these could be either local summering birds, pre-migratory concentrations, or early migrants.

Based on these observations, summer flocks of Sandhill Cranes appear to occur regularly in southern and central Manitoba. They tend to gather in fields of seedling crops, such as cereal grains and canola, often in the evening. The population of Sandhill Cranes in this region has increased in recent years, so the lack of similar records before 1981 is not surprising. As suggested by Koonz, these are probably gatherings of non-breeding birds. Tacha cites a breeding age of three to five years for this species.[2] Therefore, a substantial non-breeding subadult population might be expected in or near nesting areas, although non-breeding flocks do not necessarily originate from local populations. The five localities (Figure 1) follow a diagonal line across the province, illustrating the Sandhill Crane's affinity for farmland near the margins of the boreal forest.

There are few definite breeding records of Sandhill Cranes in southeastern Manitoba, but bugling and dancing pairs are often seen in spring. They appear to breed in

Juvenile Sandhill Crane — *Roy John*

secluded bogs. On 18 June 1989, Colin Bradshaw (a visiting birder from England) reported being "attacked" by a Sandhill Crane, evidently protecting a nest or young, in an extensive bog about 20 km southwest of Lac du Bonnet. On 16 June 1996, a party of birders led by David Hatch saw a pair of Sandhill Cranes with two small young in an alfalfa field 2 km south of Lac du Bonnet. These dates indicate that breeding cranes would be attending closely to nesting activities when most of the flocks described above were seen.

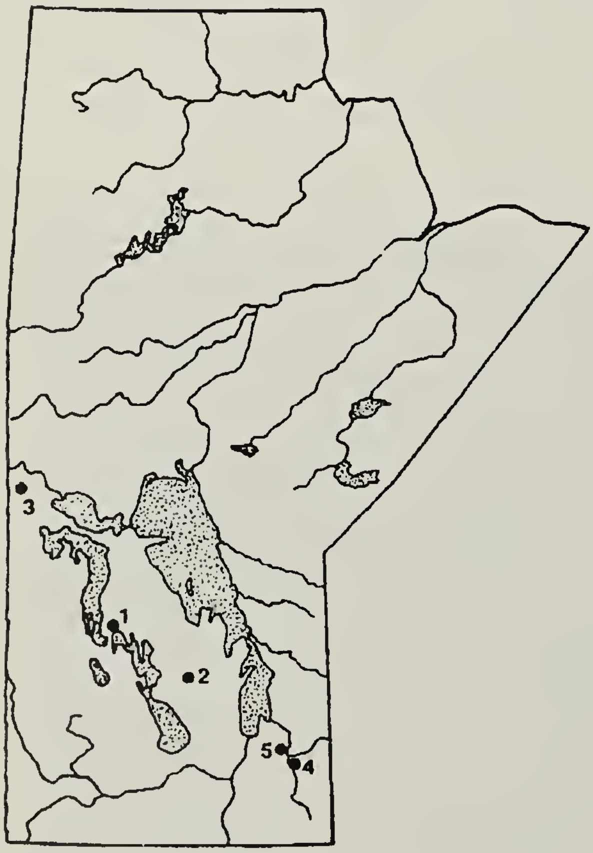


Figure 1. Map of Manitoba, showing the localities discussed in the text, near (1) Waterhen, (2) Ashern, (3) The Pas, (4) River Hills, and (5) Lac du Bonnet.

Tacha found that cheek-patch colour in Sandhill Cranes changes with age (white in adults; gray in 100% of 17 1.5-to-2-year-old birds and 78% of 18 2.5-to-3-year-olds).[2] When observing the Lac du Bonnet flock on 1 July 1992, I noted that the white cheek patch was clearly visible on most birds, although a little dingy in many cases. This observation is inconclusive, but would be consistent with a flock composed mainly of birds at least three years old.

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SASKATCHEWAN RESULTS OF THE 1996 INTERNATIONAL PIPING PLOVER CENSUS

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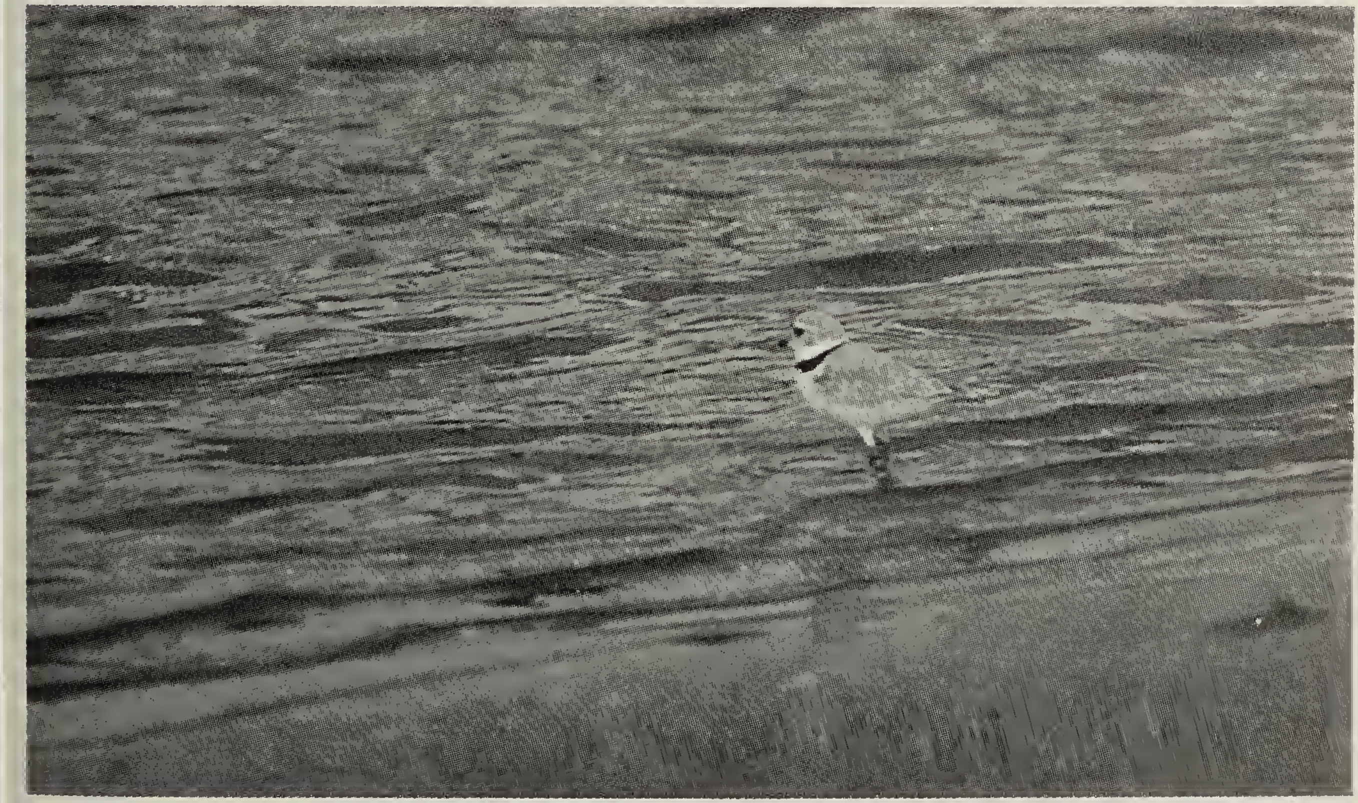
The Piping Plover and its endangered status has become familiar to many of us in recent years. This small shorebird first captured the public's attention in 1991 with the occurrence of the first comprehensive international Piping Plover breeding census. In the spring of 1996, attention from researchers and naturalists across Canada and the United States was again focused on this species for the second coordinated complete census of Piping Plover breeding habitat. All nine provinces and 28 states where Piping Plovers are known to breed participated. The goal of the second census was to obtain a reliable estimate of the population in 1996, and to compare this with the 1991 estimate. In Saskatchewan, the 1996 census was coordinated by the authors.

The Piping Plover is very specific in its choice of nesting habitat. It chooses sandy or gravelly beaches along shores of rivers and saline or freshwater lakes and ponds across the Prairies and Great Plains of North America. It also occurs along beaches of the Atlantic coast, where just under half the continental population nests, and in the Great Lakes region, where a remnant population has almost disappeared. Evidence that the Piping Plover may have been in decline prior to 1980,[1,2] coupled with indications from surveys of



Piping Plover

Roy John

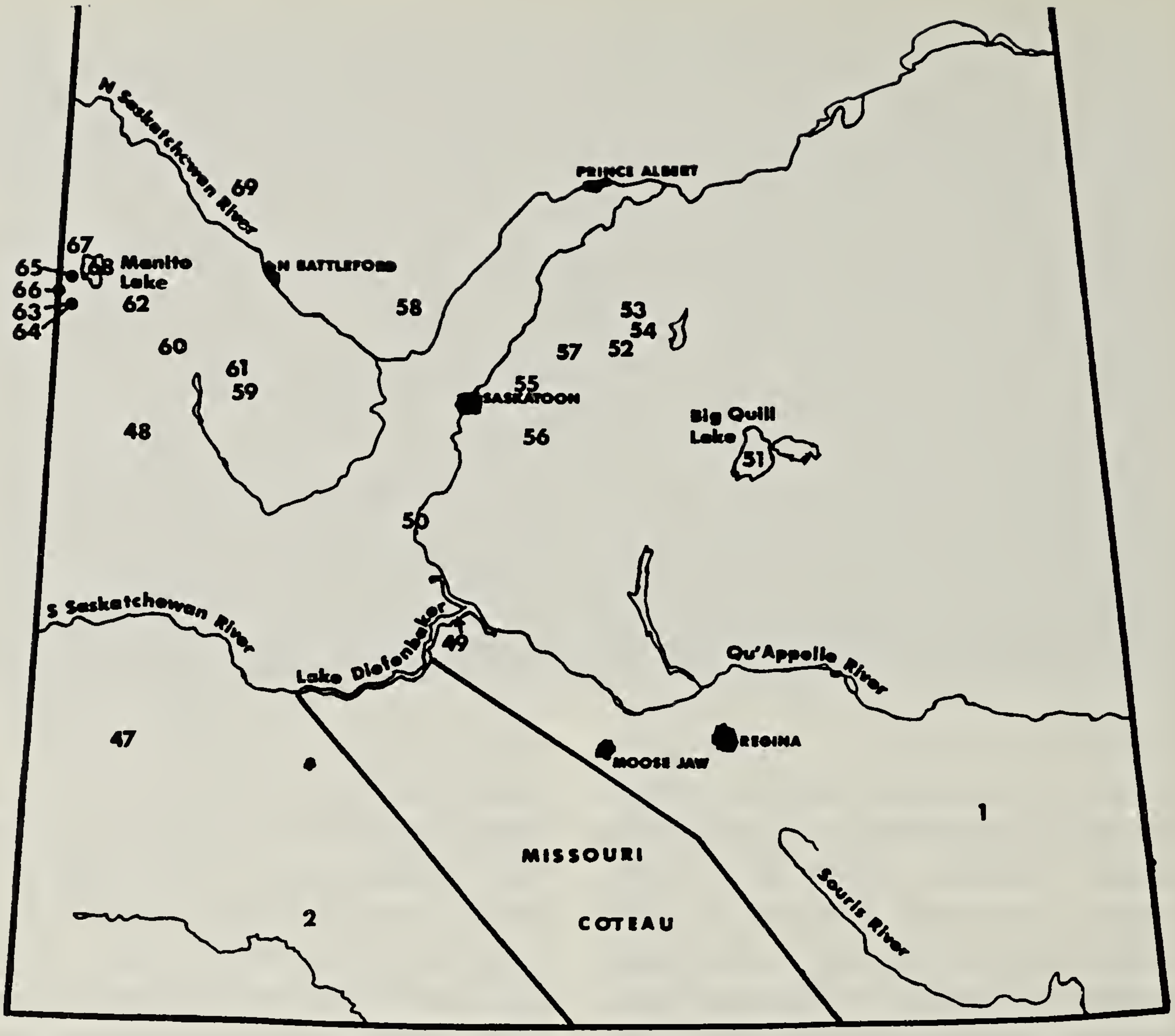


Figure 1. Piping Plover locations in Saskatchewan, 1996, excluding the Missouri Coteau. Numbering follows Table 1.

further decline through the 1980s, were cause for concern and resulted in the Piping Plover being designated as “Endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1985. Drought conditions in the 1980s on the Prairies, and increasing human disturbance, particularly on the Atlantic coast, may have contributed to any recent decline.

In the intervening years since the 1991 census, many regions have acted to improve nesting conditions for the Piping Plover. Actions have included public and landowner awareness of the plover and its habits, fencing of high-use shoreline habitat from cattle on the Prairies, and beach signage and timely closure of some nesting areas to public access on the Atlantic coast.

In 1991, three large basins — Lake Diefenbaker, Big Quill Lake and Manito Lake — and a variety of smaller wetlands in the Missouri Coteau area were home to most of Saskatchewan’s plovers.[19,20] Although surveys since 1991 indicated that most of these areas have had consistent plover use,[21] concentrations of plovers can change dramatically in response to fluctuating water regimes and resulting changes in habitat conditions and availability.

Selection and Surveying of Sites
Sites were selected for the 1996 census based primarily on the results of the 1991 census. They included sites with Piping Plovers in 1991, sites with no plovers but identified as having potential habitat, and three sites not visited in 1991 but

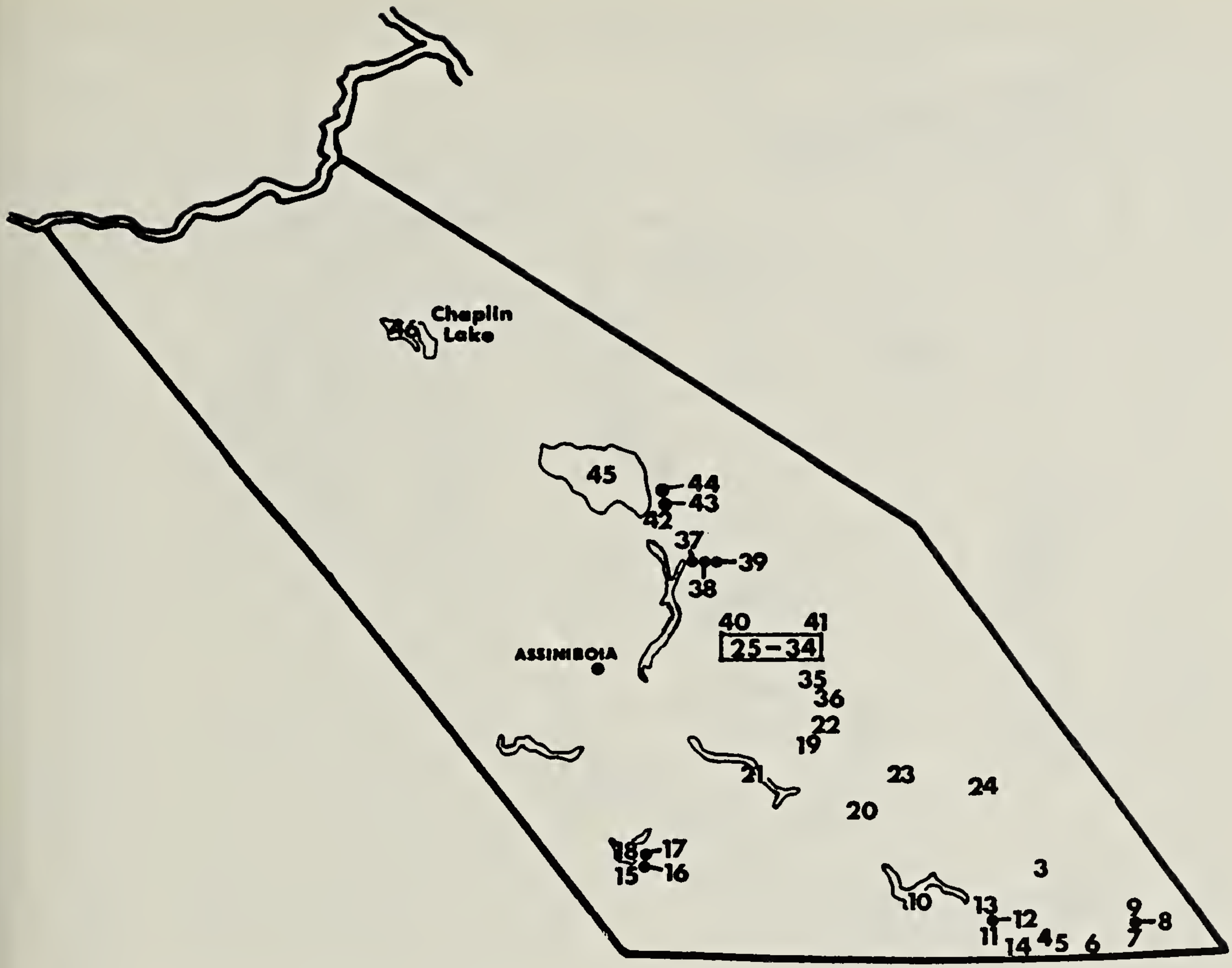


Figure 2. Piping Plover locations in the Missouri Coteau of Saskatchewan, 1996. Numbering follows Table 1.

identified since then as having plovers. For the Missouri Coteau area of south-central Saskatchewan (an area with hundreds of basins), in addition to sites with plovers in 1991, suitable basins identified on an aerial survey (16-20 May 1996) were censused, as was done in 1991. Lake Athabasca, which had no plovers in 1991, was not censused in 1996.

A total of 276 sites were censused, varying in size from a few hectares to thousands of hectares. This was substantially less than the almost 500 sites censused in 1991 because many sites that were of unknown potential in 1991 were eliminated on the basis of having no potential habitat. Participants in the census included biologists from Saskatchewan Environment and Resource Management, Saskatchewan Wetland Conservation Corporation, Canadian Wildlife Service, Ducks Unlimited, consulting biologists on contract, and over 50 volunteers.

All censuses were conducted on 31 May-29 June, with the great majority in the period 1-16 June. Censuses followed procedures set out in the Guidelines for the 1996 International Piping Plover Breeding Census.[21] Potential threats to the habitat were also identified.

For each site surveyors mapped all observations of breeding pairs, single adults with a nest or young, and unpaired adults. Number of adults recorded was defined as the actual number of individual birds observed. Number of pairs recorded was defined as the number of territorial pairs (presumed mated) plus single adults with a nest or young. (See [21] for further details of methodology.)

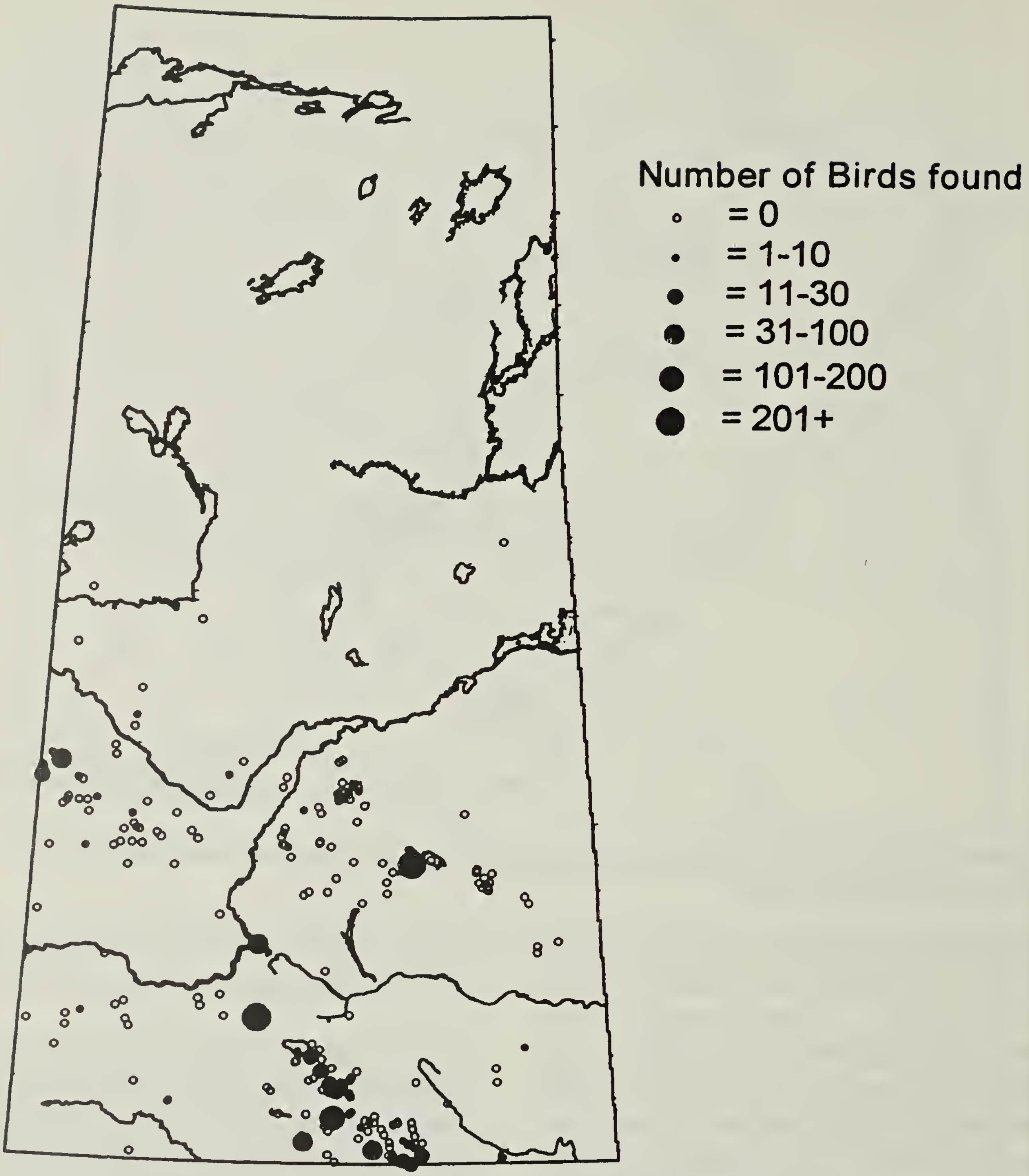


Figure 3. The distribution pattern of Piping Plovers and areas censused for Piping Plovers in Saskatchewan, 1996.

Population Size A high proportion of the world population of Piping Plovers again resided in Saskatchewan. The provincial count of 1348 adult birds comprises 22.9% of the total North American count of 5896 plovers (J. Plissner pers. comm.). This is similar to 1991 when the count of 1172 birds comprised 21.4% of the total of 5487 birds.[5] In the five-year period from 1991 to 1996, an encouraging continental increase of 7.5% occurred.

Piping Plovers were most abundant on the Prairies/Northern Great Plains, where 3,284 plovers were counted (3,469 in 1991) compared to 2,568 on the Atlantic coast (1,979 in 1991) and 44 on the Great Lakes (39 in 1991). Although Saskatchewan's "population" exhibited an increase of 15.0% since 1991 (but see below), the overall population on the Prairies/Northern Great Plains declined by 5.3%. On the Atlantic coast there was an impressive increase of 29.7%.

The 1996 and 1991 Saskatchewan results are comparable. The coverage was similar in both years, as

Table 1. LOCATION AND NUMBER OF PIPING PLOVERS FOUND IN SASKATCHEWAN, 1996

Number	Date	Site[a]	Number of birds	Number of pairs	Km of habitat[b]	% of habitat[c]
1	15 June	Kipling Marsh (62L2)	1	0	0.5	50
2	10 June	trail nr Driscoll Lake	1	0	0.0	NH
3	3 June	415 530 (72H1)	1	0	1.0	100
4	7 June	East Coteau Lake	24	9	9.0	100
5	2 June	Little Coteau Lake (72H1)	2	1	1.5	100
6	13 June	Alkali Lake	22	5	9.6	100
7	2 June	613 345 (72H1)	1	1	1.5	100
8	2 June	613 353 (72H1)	1	0	0.8	100
9	5 June	Sandoff Lake	28	6	8.0	100
10	15 June	Big Muddy Lake	34	14	35.0	100
11	1 June	295 330 (72H2)	5	2	2.0	100
12	1 June	300 342 (72H2)	1	0	0.5	100
13	1 June	300 345 (72H2)	2	1	0.5	100
14	1 June	Lonetree Lake	1	0	3.0	100
15	1 June	Grant Lake	1	0	3.0	100
16	1 June	395 500 (72H4)	1	0	1.0	100
17	1 June	400 535 (72H4)	1	0	3.0	100
18	8 June	Fife Lake	53	13	29.0	100
19	2 June	850 814 (72H6)	2	1	1.0	100
20	4 June	Coal Mine Lake	10	4	8.0	100
21	14 June	Willow Bunch Lake	124	57	113.4	100
22	2 June	Horizon Lake	9	4	10.0	100
23	3 June	Edna Lake	3	0	10.0	100
24	3 June	304 706 (72H7)	2	0	2.5	100
25	4 June	Dryboro Lake	7	4	4.0	100
26	4 June	650 075 (72H11)	1	0	0.8	100
27	4 June	Burn Lake	17	8	9.0	100
28	4 June	705 056 (72H11)	11	5	3.0	100
29	3 June	714 054 (72H11)	2	1	1.5	100
30	3 June	717 067 (72H11)	2	1	1.5	100
31	4 June	Shoe Lake	12	6	4.0	100
32	4 June	832 010 (72H11)	2	1	1.0	100
33	4 June	840 020 (72H11)	5	2	3.5	100
34	4 June	842 027 (72H11)	5	2	3.0	100
35	5 June	846 992 (72H11)	3	1	3.6	96
36	5 June	856 984 (72H11)	1	0	1.0	100
37	4 June	540 279 (72H13)	22	8	5.0	100
38	5 June	560 273 (72H13)	4	0	3.0	100
39	5 June	565 273 (72H13)	1	0	1.5	100
40	3 June	Bliss Lake	18	6	10.0	100
41	3 June	842 162 (72H14)	3	1	1.5	100
42	8 June	Frederick Lake	22	8	14.0	100
43	7 June	500 450 (72I4)	5	2	3.0	100
44	6 June	503 440 (72I4)	4	1	3.0	100
45	13 June	Old Wives Lake	8	2	115.3	100
46	5 June	Chaplin Lake	205	74	62.4	100
47	6 June	Freefight Lake	4	1	5.0	100

Table 1, continued

Number	Date	Site[a]	Number of birds	Number of pairs	Km of habitat[b]	% of habitat[c]
48	11 June	Zella Lake	4	2	3.2	100
49	8 June	Lake Diefenbaker	75	28	256.0	91
50	5 June	mid. South Sask River	2	1	160.0	100
51	12 June	Big Quill Lake	435	196	122.7	90
52	4 June	665 130 (73A6,5)	2	1	1.0	100
53	13 June	Basin Lake	3	2	26.0	100
54	13 June	Middle Lake	3	2	9.5	100
55	11 June	Burke Lake	1	0	8.0	100
56	14 June	155 642 (73B1)	6	3	9.0	100
57	3 June	Buffer Lake	6	2	1.5	100
58	10 June	Redberry Lake	4	2	22.0	100
59	8 June	722 817 (73C1)	1	0	6.0	99
60	6 June	Killsquaw Lakes	4	2	3.0	100
61	11 June	Aroma Lake	2	1	4.5	100
62	6 June	Seagram Lake West	7	2	10.1	100
63	4 June	Freshwater Lake South	17	8	9.4	100
64	4 June	Freshwater Lake North	4	2	4.8	100
65	5 June	Reflex Lake East	2	1	3.8	100
66	2 June	Reflex Lake West, SK	7	3	3.7	100
67	2 June	Wells Lake	1	0	0.0	NH
68	4 June	Manito Lake	63	21	77.7	100
69	18 June	Russell Lake	5	3	3.0	100
Total			1,348	534	1,258.3	

[a] Unnamed sites are identified by universal Transverse Mercator (UTM) grid number and map sheet
[b] Km of suitable habitat that was censused
[c] Percentage of estimated Piper Plover habitat that was censused; NH indicates no habitat was present.

were the areas of suitable habitat searched (95.8% in 1996). Only one site not censused in 1991 was subsequently discovered to support plovers and surveyed in 1996, and only one site with plovers in 1991 was missed in 1996. Taking these two sites into consideration, the 1991 adjusted total of 1170 birds (excluding 2 birds at Skyeta Lake in 1991 from 1172 birds) and the 1996 adjusted total of 1333 birds (excluding 15 birds counted at Freshwater Lake in 1995 from 1348 birds) represents a 13.9% increase.

With 1348 birds, more plovers occurred in Saskatchewan than any other province or state, followed by North Dakota with 1003 plovers and Nebraska with 366 plovers. Saskatchewan's count comprised 63.9% of the total Canadian population of 2111 plovers (60.1% in 1991), and 79.9% of the Canadian Prairie population of 1687 plovers (81.6% in 1991). The remaining 424 plovers counted in Canada occurred on the Atlantic coast.

From a provincial viewpoint, Saskatchewan's increase from 1991 to 1996 appears promising at first. However, an influx of plovers from elsewhere on the Prairies may have been a major factor in this increase. Plover numbers on the Great Plains of the U.S. decreased from 2032 birds in 1991 to 1597 birds in 1996, a decrease largely attributed to high water and flooding of much of the plover's habitat along the Platte and Missouri Rivers in 1996 (J. Plissner pers. comm.). Many birds that may have normally nested there may well have continued on to Saskatchewan. Even if a real increase may have occurred in Saskatchewan's "population," it would be overshadowed by the overall decrease in plovers on the Prairies/Northern Great Plains.

Distribution In Saskatchewan, Piping Plovers were located at 69 basins in 1996 (Table 1, Figs. 1 and 2), compared to 71 basins in 1991. One or more pairs were found at 51 sites versus 57 sites in 1991; these sites represent potential breeding locations.

Although Piping Plovers were located over much of the southern third of Saskatchewan, they were concentrated in three areas: Big Quill Lake, Chaplin Lake, and in the south portion of the Missouri Coteau (Fig. 3). These three areas had, respectively, 32% (435 birds), 15% (205 birds), and 36% (483 birds over 43 basins) of the provincial population. Smaller clusters occurred in the northwest by Manito Lake, and in the east portion of Lake Diefenbaker.

Thirty-five basins had plovers in both 1991 and 1996.[21] Change in basin use primarily occurred at smaller basins and/or at basins with smaller populations. Most basins with at least 10 plovers in 1991 or 1996 had plovers in the other year (17 of 23 basins).

Although the areas of concentration in 1996 appear to have consistent use by Piping Plovers, the magnitude of numbers counted at several key locations differed substantially from counts in 1991. The three most highly populated sites in 1996 had impressive increases over the 1991 counts: Big Quill Lake increased by 263% (from 151 to 435 birds), Chaplin Lake by 45% (113 to 205 birds), and Willow Bunch Lake by 300% (31 to 124 birds). In contrast, Lake Diefenbaker, which had the highest count in North America in 1991, decreased by 77% (from 276 to 75 birds).

Wide fluctuations in numbers from 1991 to 1996 counts occurred at both small and large sites. Because the provincial population change was relatively small (an increase of 15%), this suggests that fluctuations at an individual site are more indicative of a movement from one basin to another, than of an overall population change. The substantial changes in distribution underscore the fact that monitoring population levels at selected sites may not provide an accurate indicator of overall population change.

Quill Lakes The largest breeding population of any basin in North America in 1996 occurred at Big Quill Lake, which attracted 7.9% of the continental population. In 1991, Lake Diefenbaker had the distinction of being the most important site continentally, with 5.1% of the population.

Large fluctuations in numbers characterize the "population" at Big Quill Lake, which has supported plovers every year since annual counts began in 1984.[8,10,11,12,14,15] Since 1990, counts have consistently been over 100 birds: 110 in 1990,[11] 151 in 1991,[12] 211 in 1993,[8] and peaking at over 440 birds in 1995 (W.C. Harris pers. comm.) and 435 in 1996. (Data is not available for 1992 and 1994, W. Harris pers. comm.) With a low count of 43 plovers in 1989,[14] the 1995 and 1996 counts represent a ten-fold increase over a six-year period. Plovers have been documented around the entire shoreline. In 1991 and 1996, highest densities occurred along the entire west and east sides with lowest densities at the north tip and along the south shore.

The wide fluctuations in use by plovers may reflect changes in water level and resulting changes in habitat conditions that have occurred over the last 10 years. Water level at this shallow, expansive lake reached a 30-year low in 1993, recovering with an increase of 1.15 m by 1995, and a further 0.1 m increase in 1996 (Saskatchewan Water Corporation). In 1989, numbers plummeted as distances between traditional nesting beaches and the water line increased to 1-10 km.[14] Numbers began increasing in 1990 as previously barren gravel beaches closer to the existing water line acquired vegetative growth and began supporting nesting plovers.[11] With increasing water levels from 1994 to 1996 due to higher annual precipitation and spring runoff, the average distance on nesting beaches from vegetation to water was reduced to about 1 km in 1993 and 1994, and to less than 200 m in 1995[9] and 1996. Piping Plover numbers have steadily increased since 1990 as a result of decreasing distances from nesting beaches to water, which are a function of both water level and consequent vegetative changes.

At Little Quill Lake numbers of plovers also fluctuate with the water regime. Numbers have varied from 0 in 1996 with present high water levels to a high of 39 birds in 1993 when there was substantial exposed shoreline (D. Duncan).

Chaplin Lake Chaplin Lake is also an important breeding site to Piping Plovers. It had the second highest count in Saskatchewan in 1996 (205 plovers), and the third highest count in 1991 (113 birds[12]). In a 1984 partial survey, 253 plovers were counted.[15] In the years 1987, 1988, and 1990, when water levels were very low to almost dry, numbers of plovers were also low: 57,[13] 17,[7] and 66[11] birds, respectively. Progressive increases in water levels in 1991 and 1996 were accompanied by increases in plovers.

The shorelines, and subsequently plover use, of the basins of this large, shallow saline lake change substantially with changes in water level. The west basin and Midtskogen Bay have over the years supported plovers around their entire shores. The west basin has consistently had water and a high proportion of the plovers in surveys since 1984. Available habitat around Midtskogen Bay however was reduced in 1991 and eliminated in 1996 by higher water. The east basin has supported varying numbers of plovers over the years. The south basin supported plovers in 1984, but more recently has had little habitat (dry in 1987, vegetated in 1990, and flooded in 1991 and 1996). Parts of Chaplin Lake that have been flooded in recent years will likely support plovers when the water recedes. Flooding and high water appear to reduce vegetative encroachment and thus renew plover habitat.

Missouri Coteau (excluding Chaplin Lake) The Missouri Coteau, with its hundreds of basins of varying size, is another area of great importance to Piping Plovers. In 1996, 483 plovers were counted scattered over 43 basins (30 basins with at least one pair). In 1991, 345 plovers were counted over 39 basins (28 basins with at least one pair).[20] Including the 205 plovers at Chaplin Lake, the total count in 1996 of 688 birds throughout the Missouri Coteau comprises

51% of the Saskatchewan population (in 1991 the total of 458 comprised 39%).

Although some larger basins with gravelly shores have consistent use, plover use of most basins changes from year to year in response to precipitation and vegetative growth. Of the 59 basins that were used in at least one year of 1991 and 1996, only 21 basins (36%) were used in both years. In 1991, when water levels were just beginning to rise after the drought of the late 1980s, there were more basins identified as having habitat (131 basins[19]) than in 1996 (93 basins) when water levels were considerably higher and many basins were flooded.

The fewer basins with suitable habitat in 1996 may account for the greater concentration of plovers that occurred at a few of the larger basins, most notably Chaplin (see above), Willow Bunch, and Fife Lakes. Willow Bunch Lake, a long, narrow lake with rocky and gravelly beaches rimmed by high steep banks, had an unexpectedly high count of 124 birds. Birds were distributed along the entire length of the lake, excluding the ends. Two previous counts resulted in only 31 birds in 1991,[20] and seven birds in a 1984 census of 47% of the shore.[15] Fife Lake also had an unexpectedly high count of 53 birds, most distributed along the north and east rocky and gravelly shores of this large, wide lake. Previous counts vary from seven birds in 1986 (W. Harris pers. comm.) to 29 birds in 1991.[20]

Counts of over 20 birds occurred at six other basins of varying size and history of previous use. The plover count of 34 birds at Big Muddy Lake in 1996 was similar to the 1991 count of 26 birds.[20] Plover habitat at this long, narrow lake is largely restricted to points along the eastern two-thirds. Although Sandoff Lake, a small alkali basin, had counts of 25 and 28 birds in 1991[20] and 1996, respectively, numbers were lower in the intervening years at eight birds in 1993 (D. Hjertaas pers. comm.) and 10 in 1994 (D. Duncan). East Coteau Lake, a mid-sized basin, has consistently had 20-25 birds in 1991 and 1993-1996 (D. Duncan). Alkali Lake (the Canadian portion of this basin's convoluted shoreline) had a high count of 22 birds in 1996, but no birds in 1991[19] and just three in 1994 (D. Duncan). A small unnamed basin (UTM 540 279) with wide gravelly beaches near the northeast arm of Lake of the Rivers supported >10 plovers in both census years (11 in 1991[20] and 22 in 1996), as did Frederick Lake (12 in 1991[20] and 22 in 1996).

A sharp drop in plover numbers occurred at Old Wives Lake since 1991 when 42 birds[20] were counted. In 1993 and 1994, 12 (D. Hjertaas pers. comm.) and 27 birds (D. Duncan) were counted, respectively, in partial shoreline surveys. Only eight were counted in 1996, most in small gravel areas near seepages along the south or southeast shore. Water levels have become progressively higher since 1991, although the basin remained below historical high levels up to 1996. Several other basins experienced dramatic drops in plover numbers from 1991 to 1996, most notably Channel Lake (from 19 to 0 birds).

Trampling of beaches by cattle was identified as a moderate to high threat to plover habitat at only 10 sites with plovers, including two sites with 10 plovers (Big Muddy and Burn Lakes).[21] It was considered a low threat at a further 17 sites. Since

1991, when 21 sites were identified as being threatened to varying degrees from cattle trampling,[19] fences have been erected on portions of Old Wives, East Coteau, Channel and Edna Lakes (as well as at Big Quill Lake). Drought, a natural cause of reduced habitat availability in 1991, was not a consideration in 1996. Rather, high water contributed to less habitat being available in 1996.

Lake Diefenbaker The plover population at Lake Diefenbaker has been in decline since the 1991 high count of 276 birds[20] when the highest concentration of plovers in North America occurred here. In 1996, only 75 plovers were counted. The majority of plovers consistently occur in the eastern third of the lake (east of Riverhurst Ferry); west of there suitable habitat occurs only at a few small areas (12 birds at 8 spots in 1991; 4 birds at 3 spots in 1996).

Counts of plovers east of Riverhurst Ferry yielded 264 plovers in 1991,[12,19] 140 in 1992,[23] and estimates of 167 in 1993[22] (78 counted at 5 sites[4]), 96 in 1994[22] (83 counted in a nearly complete census; D. Hjertaas pers. comm.), and 120 in 1995[22] (102 counted in a partial census[17]), and a count of 71 in 1996.[21] Of four censuses previous to 1991, a high population occurred only in 1984 with an estimate of 360 plovers[22] (217 counted over censused sections[15]). Counts yielded 97 plovers in 1988,[6] an estimate of 135 in 1989[22] (94 counted in the Thomson and McKenzie Arms[14]), and an estimate of 61 in 1990[22] (33 counted in the Arms[11]).

The number of plovers that nest at Lake Diefenbaker appears to be related to the water level in the reservoir in mid-May when birds are arriving.[22] The water level on May 12, the mean initiation date of nests from 1991-1996, was lower in 1984 and 1991, the two years of highest plover counts, than in any other year of counts (550.6 m in 1984 and 550.0 m in 1991 vs. 550.8-554.0 m above sea level [asl] in the other years; Sask Water Corp.). Lower water appears to result in wider beaches which are more attractive for nesting.

Fledging success appears to be related to water level and change in water level during the breeding period.[22] The lower the water level on July 1 and the smaller the change in water level from May 12-July 1, the higher the productivity. In 10 years of data from 1986-1996, fledging success varied from 0 or near 0 young/pair (in five of the years) to an estimated 1.48 young/pair. Complete or near complete reproductive failure occurred when the July 1 water level was 556 m asl (beaches are eliminated at about 556.5 m), and when the change in water level from May 12-July 1 was 3.1 m. The data suggests that avoiding *both* of these conditions would greatly improve productivity of plovers at Lake Diefenbaker.

A rapid rise in water level and elimination of beaches during the breeding period remains the primary threat to Piping Plovers at Lake Diefenbaker in many years.[4,11,12,14,16,17,18] Predation and human disturbance also have an impact on losses,[3] although they are relatively minor. The lake may be of particular importance to plovers during periods of drought when other basins may have reduced habitat due to drying or low water.

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BUFFALO BERRY CROP IS RIPE FOR THE PICKIN'

Taylor Steeves, Saskatoon, SK

This article originally appeared in the Saskatoon Sun.

The late fall, after a few hard frosts, is the time to harvest buffalo berries (*Sheperdia canadensis*). The bright red fruits have a distinctly acid flavour, which is much improved by exposure to frost and, harvested any time from now on, they will produce a tangy, slightly spicy jelly to enhance meat or fish dishes. They also can be used to make an interesting if somewhat unusual wine.

The buffalo berry has a wide distribution on the Prairies of western North America and the Saskatoon area is just about at the northern edge of its natural range. Nonetheless it flourishes here and dense thickets with a greyish cast to the foliage are a common sight. The grey colour results from the presence of umbrella-like surface hairs that are among the most complex found on plants.

They are worth looking at closely with a good hand lens or microscope. Although the plant must be well adapted to withstand our periodic prolonged droughts, it does have a preference for locations where it can reach a reliable water supply, such as along water courses or where the water table is high. In fact, long-time prairie residents report that it has been used as an indicator of suitable spots to dig for water.

The dense thickets are the result of a vigorous system of vegetative reproduction. This is accomplished by way of roots, which give rise to shoot buds and thus establish new stems on the periphery of existing clumps. This explains how the thickets increase in size, but it does not account for the establishment of new ones. Although fruits are produced abundantly and the seeds are viable, it is extremely rare to find a seedling.

The absence of seedlings, however, is not unique to buffalo berry and is a common phenomenon among prairie woody plants. The development of clumps vegetatively as extensions of individual plants explains why some regularly bear fruit while others never do. Buffalo berry is one of those species which has separate staminate (male) and pistillate (female) individuals and consequently entire clumps will be one or the other. Only the female plants can be expected to produce fruit.

Another feature of the roots is worth noting. Buffalo berry is one of the plant species which form root nodules in association with microorganisms and these are able to fix nitrogen, certainly an advantage on prairie soils.

One distinctly unattractive feature of the buffalo berry is the formation of particularly brutal thorns, which are certainly a deterrent to berry pickers (and probably to browsing animals as well).

These thorns are modified side branches of main shoots which grow for awhile before their tips become hard and pointed. They in turn usually bear branch thorns, adding to the discomfort they can cause. There is a great deal of interest at present in the possibility of turning some of our native fruit plants into cultivated crops and the Saskatoon berry success story shows that it can be done. The buffalo berry is a good candidate for domestication but, if it is to be tamed, the plant breeders (or perhaps genetic engineers) will have to do something about those thorns.

Wild Rose *AJZ, Prairie Wildlife Centre*

THE EVENING-PRIMROSES OF SASKATCHEWAN

DIANA BIZECKI ROBSON, 811 Avenue E North, Saskatoon, SK S7L 1S7

Introduction

This article describes some of the general characteristics of the Evening-primroses (genus *Oenothera*) and presents a taxonomic treatment of the genus consisting of a dichotomous key, descriptions and habitat information.

The common name evening-primrose refers to both the family Onagraceae and the genus *Oenothera*. In this article it will refer to the latter. The evening-primroses are closely related to the Willow-herbs (Epilobium species), Butterfly-weeds (Gaura species) and Enchanter's Nightshades (Circaea species). Evening-primroses are widespread throughout the world. In Saskatchewan, there are seven species in total. The common name tends to cause some confusion. One would think that the evening-primroses are primroses which bloom in the evening.[11] In fact, they are unrelated to the primroses (Primula species), and while some species do bloom in the early evening, others bloom in the morning.[11] Those species which flower in the evening are pollinated by nocturnal insects like moths.[6] In some species, the flowers will bloom in one colour and then fade to a different colour as the day wears on. For example, Rock Rose *(Oenothera caespitosa)* (Figure 1) and White Evening-primrose *(O. nuttallii)* (Figure 2) have white flowers that turn pink later in the day.[7] Yellow Lauvauxia *(O. flava)* blooms yellow and then turns pink.[7]

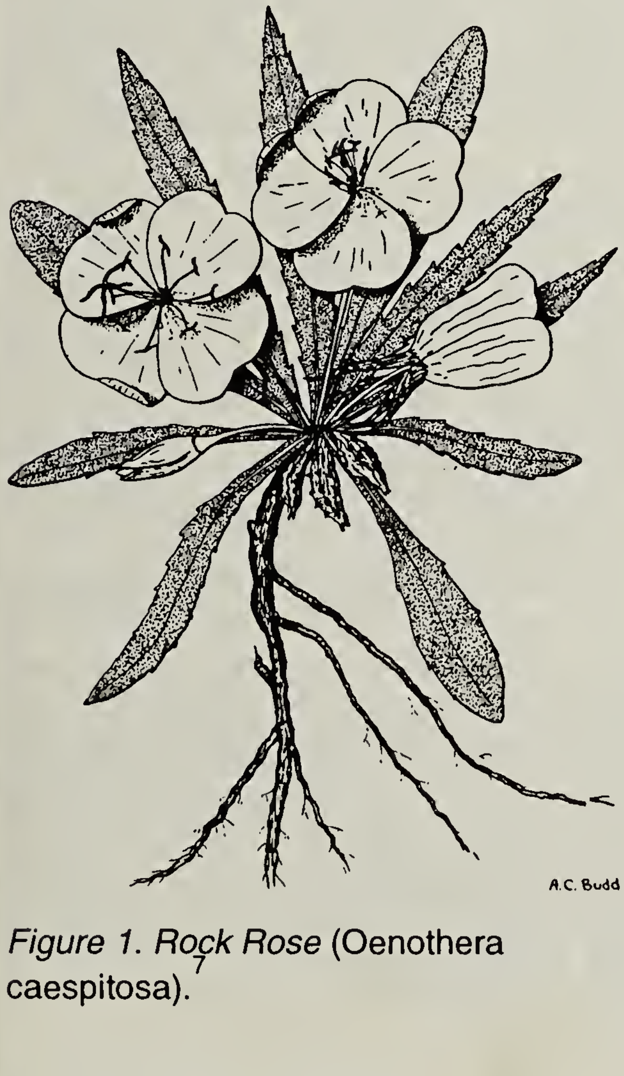

Figure 1. Rock Rose (Oenothera caespitosa).[7]

Evening-primroses occur on dry, eroded areas and around slough margins. Yellow Evening-primrose *(O. biennis)* (Figure 3) and White Evening-primrose are the most common species due to their "weedy" nature; they are found at the edges of fields and roads in sandy soil. Taraxia *(O. breviflora)* and Yellow Lavauxia occur on heavy clay soils near sloughs. Rock Rose prefers eroded, clay soils whereas Upland Evening-primrose *(O. andina)* prefers eroded, sandy soils.

Two of our native evening-primroses are considered to be rare in Canada: Upland Evening-primrose (Figure 4) and Taraxia (Figure 5).[1] These two species are often placed in another genus: *Camissonia*. Two other species of evening-primrose, Rock Rose (Figure 6) and Yellow

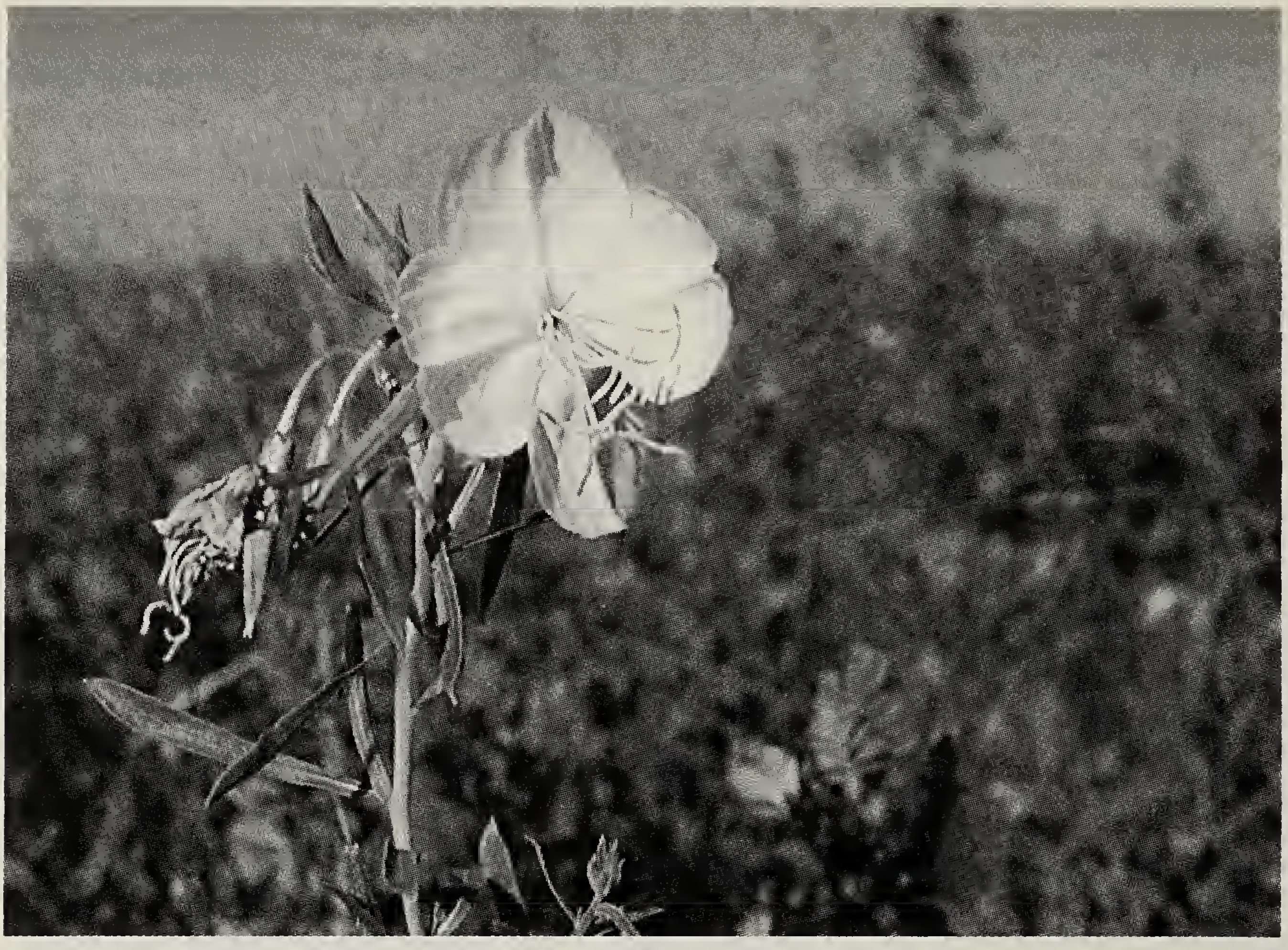

Figure 2. White Evening-primrose (Oenothera nuttallii).

Lavauxia (Figure 7), were considered rare in the past but are now considered only uncommon.[5]

The evening-primroses have several important uses. Evening-primrose oil is a source of gamma linolenic acid and is available at many health food stores.[3] Research suggests that the oil may be useful in treating eczema, asthma, migraines, inflammations, diabetes and arthritis.[6] The oil may also act as an anti-clotting device.[6] Native Americans made a tea from Yellow Evening-primrose roots to treat obesity and bowel pains.[6] The young shoots of Yellow Evening-primrose can be put in salads and the roots can be boiled and consumed.[6] Many members of this genus are attractive from a horticultural perspective. Unfortunately, germination studies have only been done for Yellow Evening-primrose and Rock Rose. Yellow Evening-primrose has been successfully cultivated as the seeds have a high germination rate when stratified.[2] Rock Roses have beautiful flowers but the seed set and germination are poor.[2] Regarding tourism, the evening-primroses are attractive to nature lovers

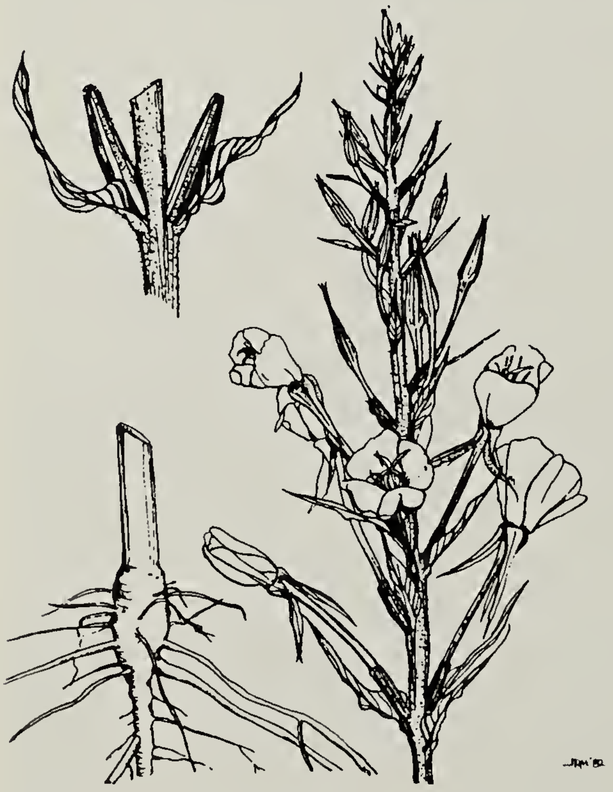

Figure 3. Inflorescence, capsules and rootstock of Yellow Evening-primrose (Oenothera biennis).[2]

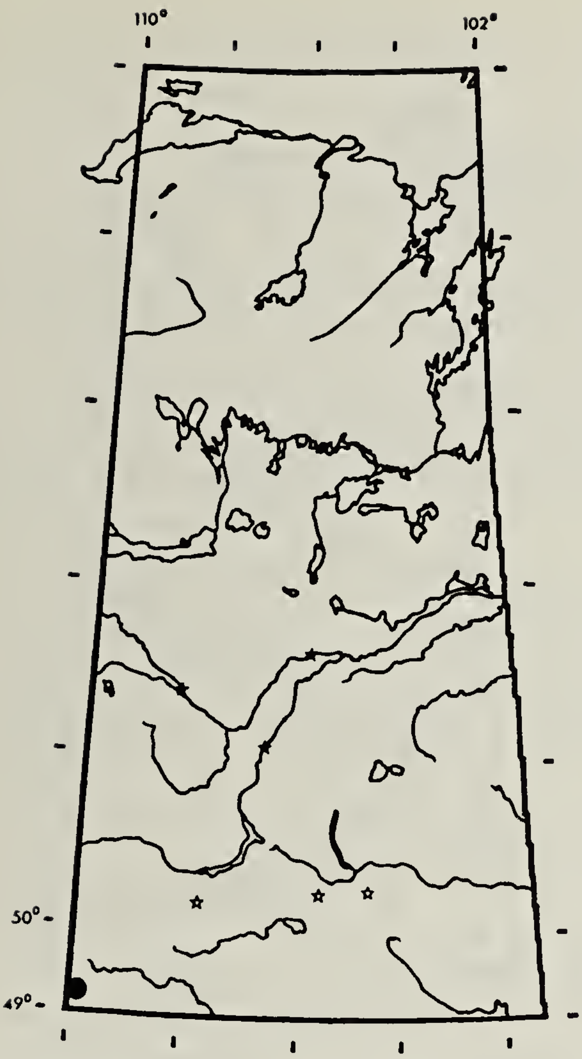

Figure 4. Distribution of Upland Evening-primrose (Oenothera andina).[5]

because of their large, beautiful, fragrant flowers. Ecologically, evening-primroses provide nectar for many species of insects and colonize eroded areas preventing soil erosion.

The evening-primroses are easy to identify with their four distinctive, heart-shaped petals, four-lobed stigmas and eight stamens with the anthers attached to the filaments near the middle (Figure 8). The leaves and either the flowers or fruits are sufficient for identification of the species.

Description of *Oenothera*[4,7,8,10]

This genus contains annual, biennial and perennial species. Some species lack stems; their leaves and flowers arise directly from the ground. Rarely, the plants are woody at the base. *Oenothera* species vary in height. The stemless plants are quite short, from 3 cm to 10 cm, while those with stems are considerably taller (5 dm to 15 dm). The leaves are alternate on plants with stems and arise from the base of the plant in stemless species.

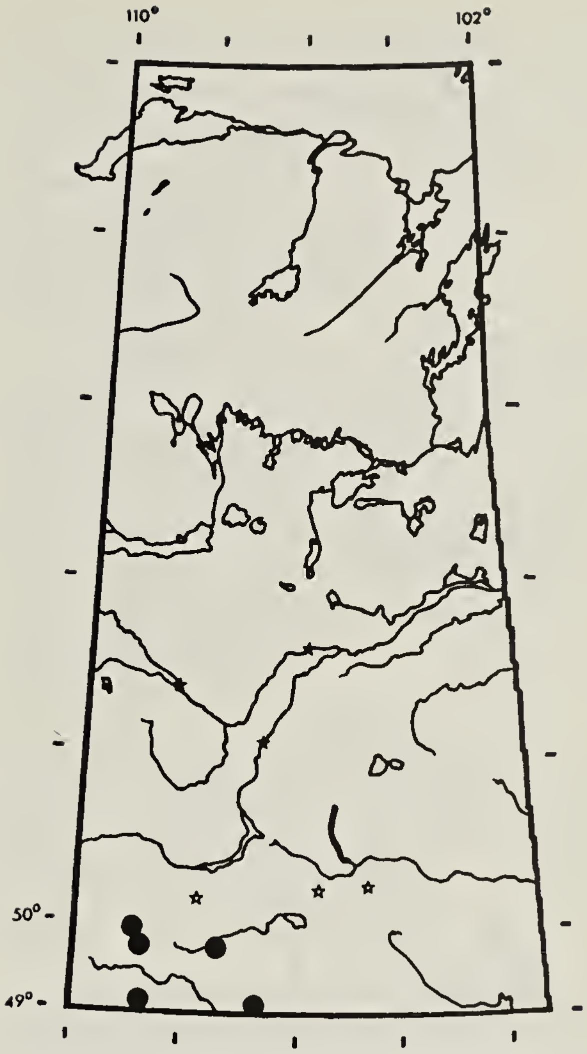

Figure 5. Distribution of Taraxia (Oenothera breviflora).[5]

The flowers are yellow, white or pink and often change colour with age. They are usually large and conspicuous but wither soon after flowering. There are four sepals and four petals. These floral parts are partly fused at the base to form a cup-like structure called a hypanthium (Figure 8). The hypanthium is fused to the ovary of the plant.

One of the most distinctive features is the four-lobed stigma especially noticeable when deeply lobed, forming a cross. The ovary occurs below the point of attachment of the sepals, petals and stamens, a position that is referred to as "inferior." The ovary has four chambers that

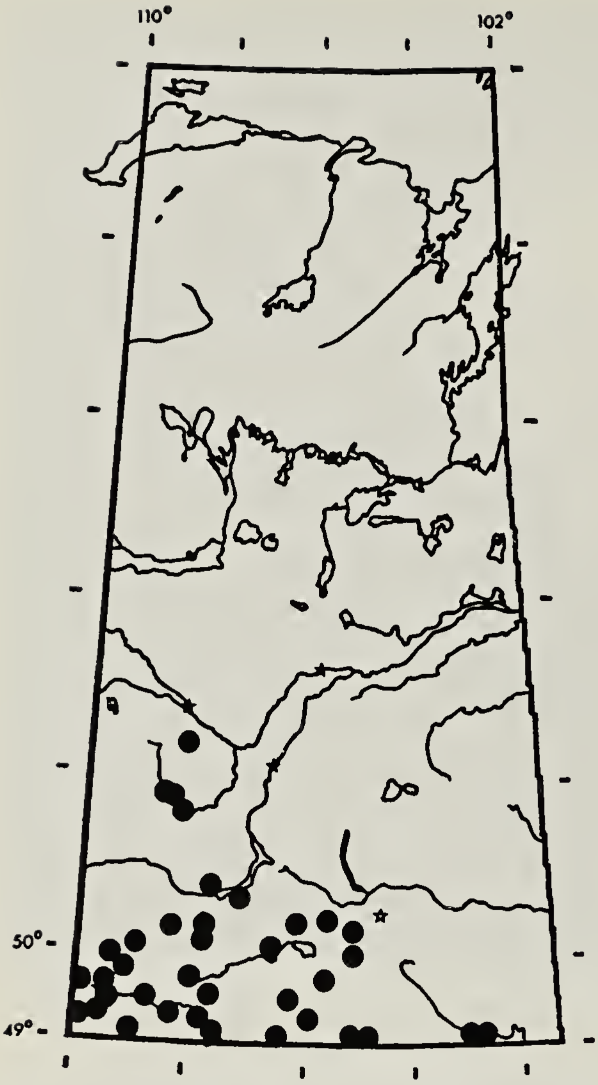

Figure 6. Distribution of Rock Rose (Oenothera caespitosa).[5]

can be seen by cutting the ovary crosswise. The ovaries mature into four-chambered capsules that contain numerous smooth seeds.

There are eight stamens in each flower. In some species the stamens are equal in length while in others the stamens opposite the petals (rather than between the petals) are shorter. The anthers of the stamens are attached to the filament at their midpoint, making them rock back and forth like a teeter-totter.

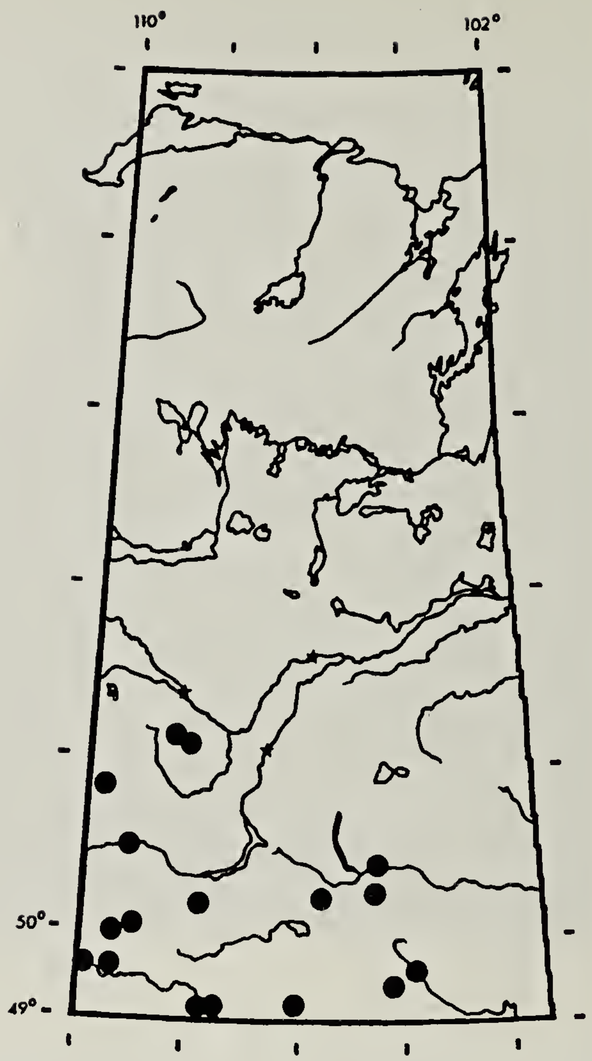

Figure 7. Distribution of Yellow Lavauxia (Oenothera Flava).[5]

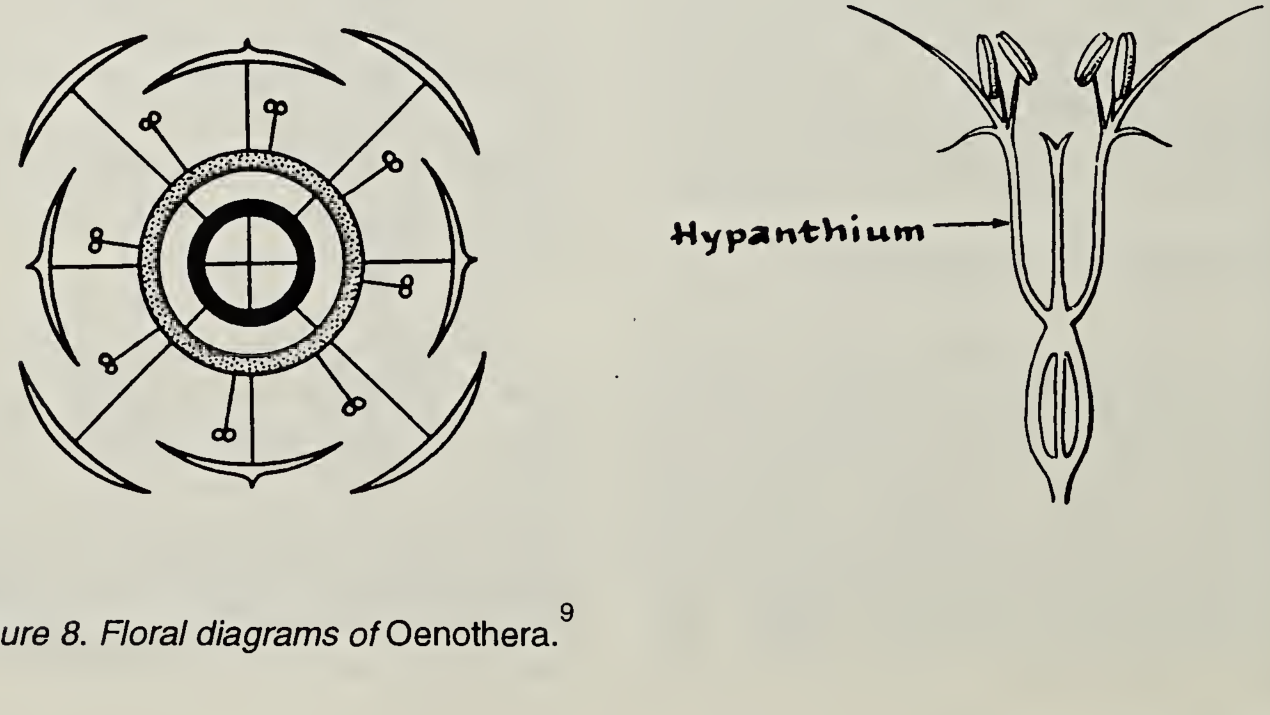

Figure 8. Floral diagrams of Oenothera.[9]

Identification Key to the Native Evening-primroses of Saskatchewan[4,7,8,10]

1a. Plants with leafy stems; flowers usually several in leafy spikes (flowers attached directly to the main stem) or racemes (flowers attached to the main stem by short stalks) - 2

1b. Plants without leafy stems; flowers single on stalks arising from the base of the plant; leaves arising from the base of the plant - 5

2a. Plants shrubby, usually with several slender brown, woody stems; stigma not deeply divided into four lobes; flowers yellow with a trumpet-shaped base - *O. serrulata*

2b. Plants not shrubby; stems not brown and woody; stigma deeply divided into four lobes - 3

3a. Annual; stems 3-10 cm tall, slender, branched; flowers small, 1-3 mm long - *O. andina*

3b. Biennial or perennial; stems taller, stout; flowers larger, more than 5 mm long - 4

4a. Biennial; flowers yellow, buds erect; stem green or reddish, not much branched; seeds in two rows; leaves oblong to lance-shaped - *O. biennis*

4b. Perennial; flowers white or pinkish, buds nodding; stems white with shreddy bark, usually much branched; seeds in one row; leaves linear to lance-shaped - *O. nuttallii*

5a. Stigma with four linear lobes; petals greater than 1 cm - 6

5b. Stigma rounded, very slightly lobed; petals less than 1 cm, yellow; leaves divided into wavy lobes - *O. breviflora*

6a. Petals greater than 25 mm long, white aging to pink; capsule not winged, to 4 cm long; leaves to 2.5 cm broad, leaf margins are straight or with teeth - *O. caespitosa*

6b. Petals less than 25 mm long, yellow aging to pink; capsule with wings at the margin, to 2 cm long; leaves to 1.5 cm broad, deeply divided on the lower third, the terminal portion entire or with wavy lobes - *O. flava*

Descriptions of Native Evening-primroses[4,7,8,10]

The plants are arranged alphabetically according to the scientific name as many of the plants have more than one common name. After each scientific name there is a list of the synonyms for that species. A synonym is another scientific name that is used.

1. Upland Evening-primrose or Andean Sundrops/*Oenothera andina* Nutt. [*Camissonia andina* (Nutt.) Raven; *Sphaerostigma andinum* (Nutt.) Walp.]

This species is an annual plant with slender stems that branch from the base. The stems are covered with fine hairs. The plant ranges from 3 to 10 cm in height. The leaves are alternate, smooth margined and linear or narrowly oblanceolate (lance-shaped with the broadest part at the tip of the leaf). The leaves are 1 to 3 cm long. The flowers are yellow and clustered in the axils of the leaves. The petals are 1 to 1.5 mm long. The stigma is rounded. Capsules are 5 to 6 mm long, spindle-shaped, greyish and with four angles. This plant is rare and occurs on dry sandy slopes in the western Prairies.

2. Yellow or Common Evening-primrose/*Oenothera biennis* L.

This species is a biennial plant with a stout taproot. It forms a leafy rosette in the first year and an erect, stiff stem in the second year when it grows to 5-15 dm tall and usually has branches. The stems are greyish or reddish in colour and are covered with small hairs. The leaves are ascending or spreading and are attached directly to the stem. Leaves are lance-shaped or somewhat oval, densely or sparsely hairy and sometimes with small teeth on the edges. The leaves vary in length from 2 to 14 cm. The flowers are in leafy, terminal spikes. The large, yellow flowers are erect and open in the evening. The hypanthium tube is about 3 cm long. The sepals are united at first except for very short free tips and later separate and bend back. The petals are 12 to 25 mm long. The stigma is deeply divided into four lobes. Capsules are 2 to 3 cm long, erect and with small hairs. The plants are in bloom from July to October. This species is very common on lighter soils throughout the southwestern portion of the Prairies and occasionally in the boreal forest.

3. Taraxia/*Oenothera breviflora* T. & G. [*Camissonia breviflora* (T. & G.) Raven; *Taraxia breviflora* (T. & G.) Nutt.]

Taraxia is a stemless, perennial species with a rosette of leaves close to the ground. The leaves are 5 to 12 cm long, deeply divided and covered with fine hairs. The petals are 5 to 8 mm long. When the petals first open they are yellow; as they dry out they turn red. The stigma is knobbed. The capsules are about 1.5 cm long, narrowly oval and covered with hairs. This species is very rare and is found on heavy clay soils of slough margins in the western Prairies.

4. Rock Rose, Butte Primrose, Gumbo or Tufted Evening-primrose/ *Oenothera caespitosa* Nutt. [*Pachylophus caespitosus* (Nutt.) Raim.]

This species is a perennial with a thick, woody root. The plants are stemless or nearly so. The leaves are lance-shaped to oblanceolate, sometimes with small hairs on the margins. The leaves are 1-2 dm in length and are sometimes toothed or wavy on the margins. The leaf stalks are winged. The flowers are sessile in the crown of the plant and have a sweet scent. The hypanthium tube is 3 to 10 cm long. The petals are 2 to 4 cm long. When the petals open in the morning they are white, but they fade to pink later in the day. The stigma is deeply divided into four linear lobes. The capsules are about 2.5 cm long, woody and four-angled; the angles having wavy crests on them. Sometimes the capsules have small bumps on them called tubercles. Rock Rose blooms from May to August. It is not common and is found on dry hillsides of gumbo or clay soil and sometimes on gumbo flats throughout the Prairies.

5. Yellow Lavauxia/*Oenothera flava* (A. Nels.) Garrett [*Lavauxia flava* A. Nels.]

Yellow Lavauxia is a stemless perennial with a fleshy taproot and rosette of leaves near the ground. The leaves are 1 to 2 dm long, oblanceolate in shape, deeply divided and coarsely toothed. The midrib of the leaves on the underside is very prominent. The leaves are sometimes hairy on the margin. The hypanthium tube is 4 to 7 cm long. The petals are 12 to 18 mm long. When they first bloom they are yellow; later in the day they turn pink. The stigma has four linear lobes. The capsules are 2 to 3 cm long, four-angled, with winged edges. The plants are in bloom from May to August. This species is not very common and can be found in valleys, slough margins, clay flats and drainage channels in the western Prairies.

6. White Evening-primrose/*Oenothera nuttallii* Sweet [*Anogra nuttallii* (Sweet) A. Nels.]

This species is a perennial with a white fleshy rootstock. The erect stems are white, somewhat shiny and have shreddy bark. The stems are often branched. The plant ranges in height from 4 to 10 dm. The leaves are 5 to 10 cm long. The leaves are linear to linear-oblong and taper at the base. The upper leaf surface has no hairs but there are hairs beneath the leaves. The flowers have an unpleasant scent. The drooping flowers grow out of the leaf axils. The hypanthium tube is 2 to 2.5 cm long. The petals are about 2 cm long. Like the Rock Rose, the petals of this species are white when they open and pink at the end of the day. The stigma is deeply divided into four lobes. The capsules are 2 to 3 cm long, slender, somewhat curved and four-angled. They are in flower from June to September. This species is very common and is found on roadsides in light or sandy soils in the Prairies and parkland. It is persistent on cultivated fields.

7. Shrubby Evening-primrose / *Oenothera serrulata* Nutt. [*Calylophus serrulatus* (Nutt.) Raven; *Meriolix serrulata* (Nutt.) Walp.]

This perennial species has a woody base. The plants range in height from 1 to 5 dm. The stems are slender, brown and erect or decumbent. The leafy branches are more or less hairy. The leaves are 2-5 cm long, alternate, spatula shaped, linear or linear oblong. The leaf margins are finely toothed or toothless, and often with short, stiff hairs. The flowers grow out of the axils of the upper leaves. The hypanthium is trumpet-shaped and four-angled. The sepals have a ridge down the back. The petals are yellow and wavy on the margins. The stigma is disc-shaped and shallowly four-lobed. The capsule is slender, greyish and 15 to 25 mm long. This species is not common and can be found on dry, sandy prairie and hillsides in the Prairies and parkland.

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NEW RARE PLANT FINDS ALONG THE SOUTH SASKATCHEWAN RIVER VALLEY

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While conducting research for a Master's thesis project on rare plants in southwestern Saskatchewan, I discovered nine new rare plant populations along the South Saskatchewan River, southwest of the Gardiner Dam. One new population of False Buffalo Grass *(Munroa squarrosa)*, three new populations of Western Hawk's-beard *(Crepis occidentalis)* and five new populations of Rush Pink *(Stephanomeria runcinata)* were found. Verified voucher specimens are on file at the W.P. Fraser Herbarium, University of Saskatchewan, Saskatoon, SK.

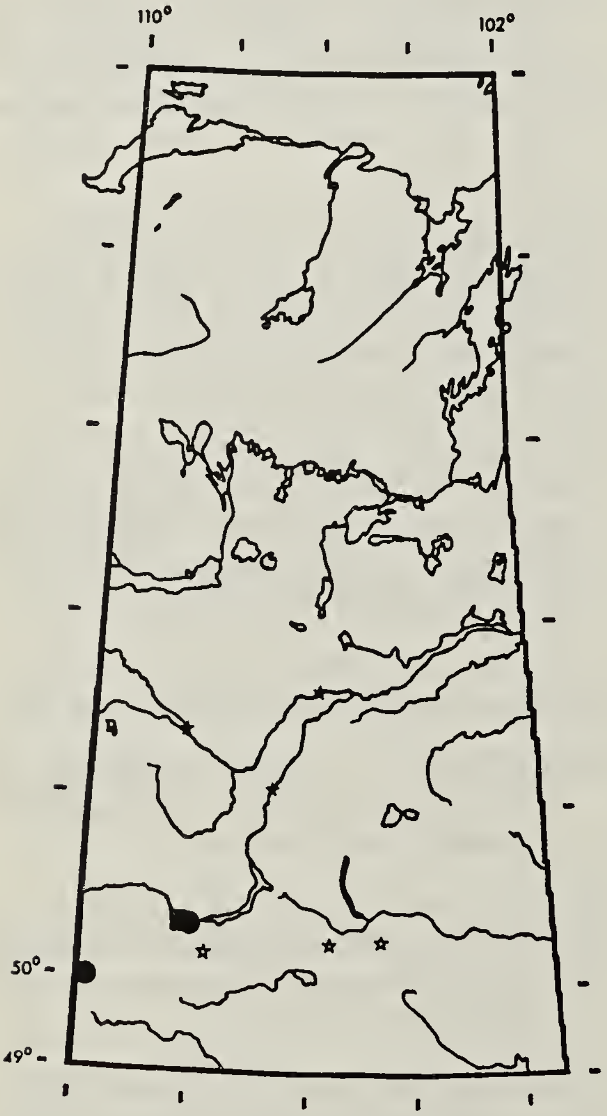

Figure 1. Distribution of False Buffalo Grass (Munroa squarrosa) *in Saskatchewan.*

● *= previous populations*

■ *= new population*

False Buffalo Grass

This population represents the third documented discovery of this plant in the province (Figure 1). The two other populations are in Saskatchewan Landing Provincial Park, and 3 km southwest of Hatton. False Buffalo Grass is a low-lying, tufted annual grass (Figure 2).[1] The leaf margins are scabrous (rough due to small hairs) and white banded, and the collar is covered with long soft hairs.[1] The plants were found on 13 July 1996 approximately 15 miles (9.4 km) southwest of Kyle (SW1/4 S9 T20 R16 W3). Forty-two live individuals and thirty dead ones were found along a gravel road about 200 m north of the river. The dead plants were killed when a road grader came by a week or two earlier. Numerous other low, weedy plants occurred in the same habitat.

Western Hawk's-beard

Western Hawk's-beard is a perennial, insect-pollinated composite (Figure 3). This species looks somewhat similar to the Common Dandelion *(Taraxacum officinale)* with yellow rayed flowers and a basal rosette of toothed leaves.[1] However, Western Hawk's-beard produces several heads on a stem as opposed to dandelions which have solitary heads.[1]

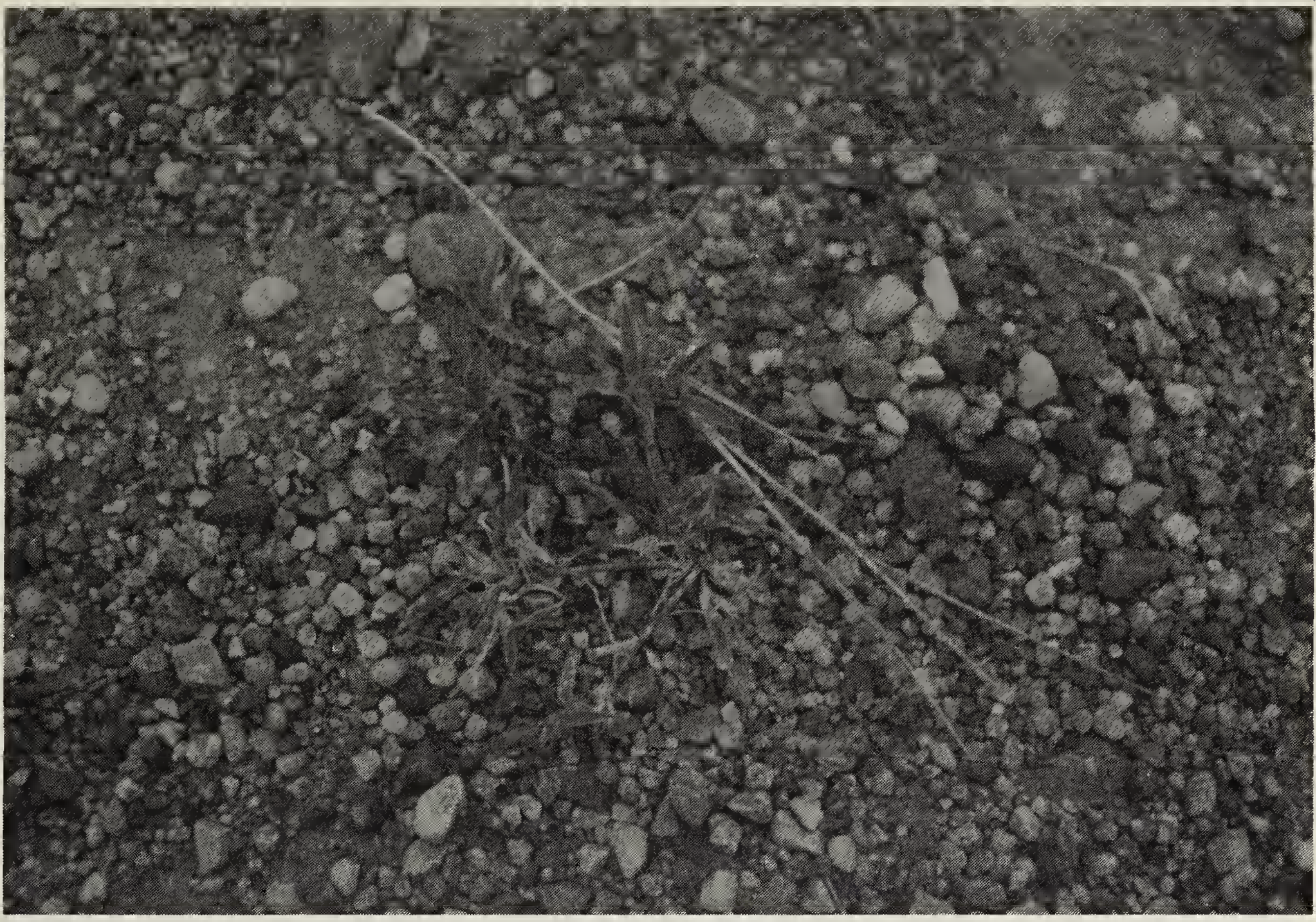

Figure 2. False Buffalo Grass (Munroa squarrosa).

As well, the leaves of Western Hawk's-beard are densely grey, soft and hairy, while those of the dandelion are hairless.[1] This species is found along the Frenchman and South Saskatchewan River valleys (Figure 4).

The first new population of Western Hawk's-beard was found on 31

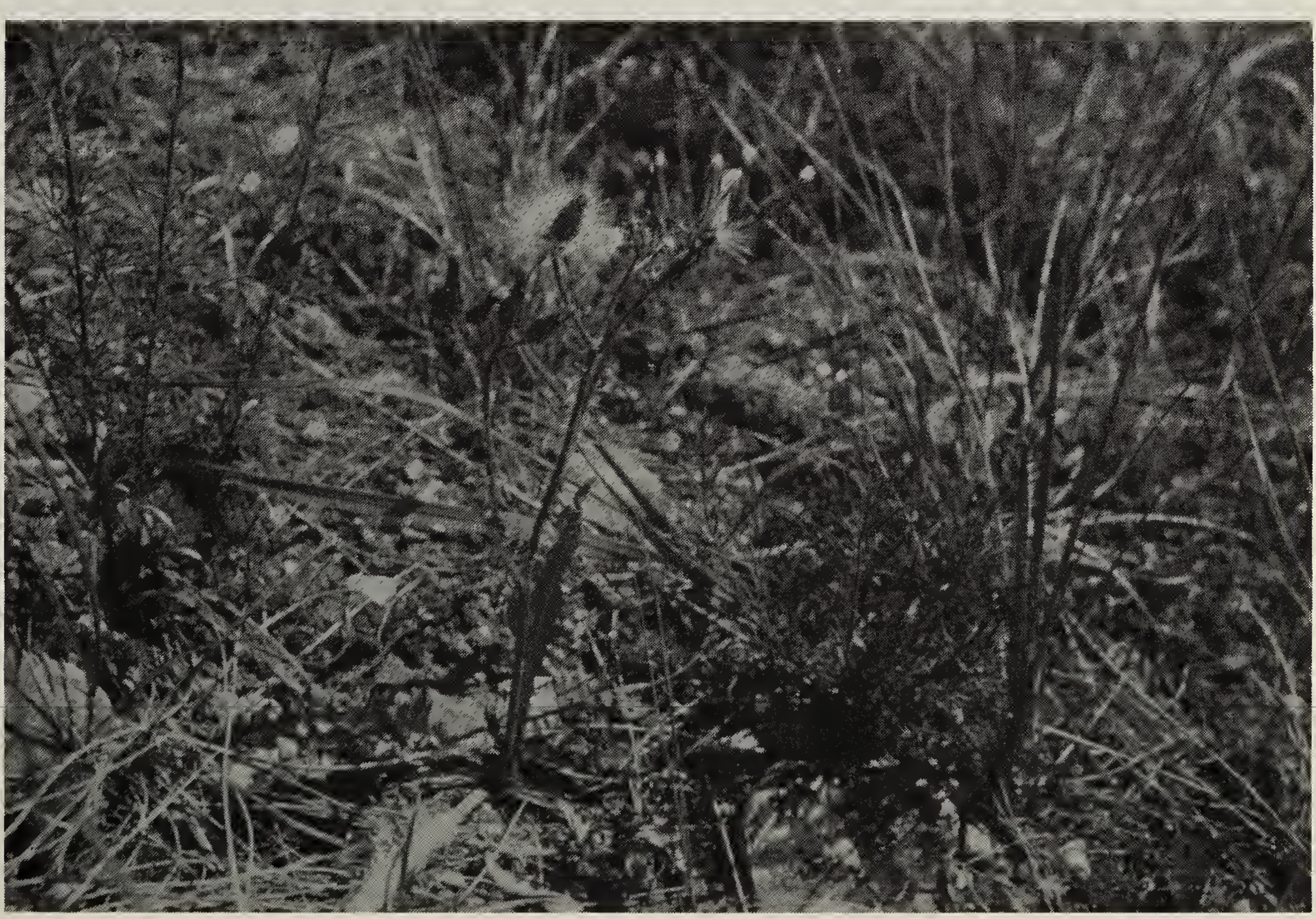

Figure 3. Western Hawk's-beard (Crepis occidentalis).

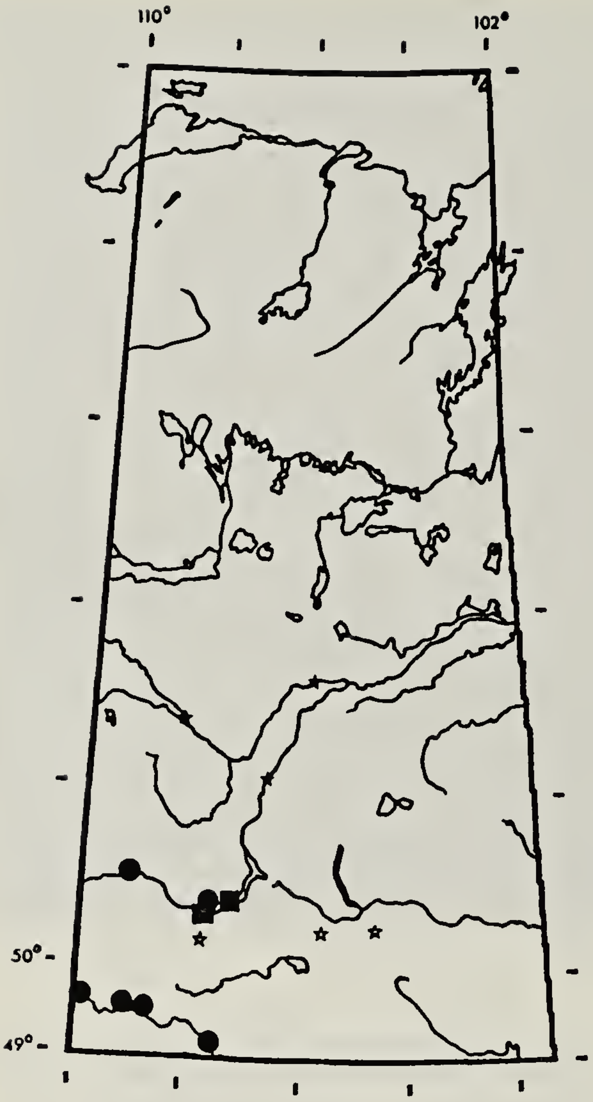

Figure 4. Distribution of Western Hawks-beard (Crepis occidentalis) *in Saskatchewan.*
● *= previous populations*
■ *= new population*

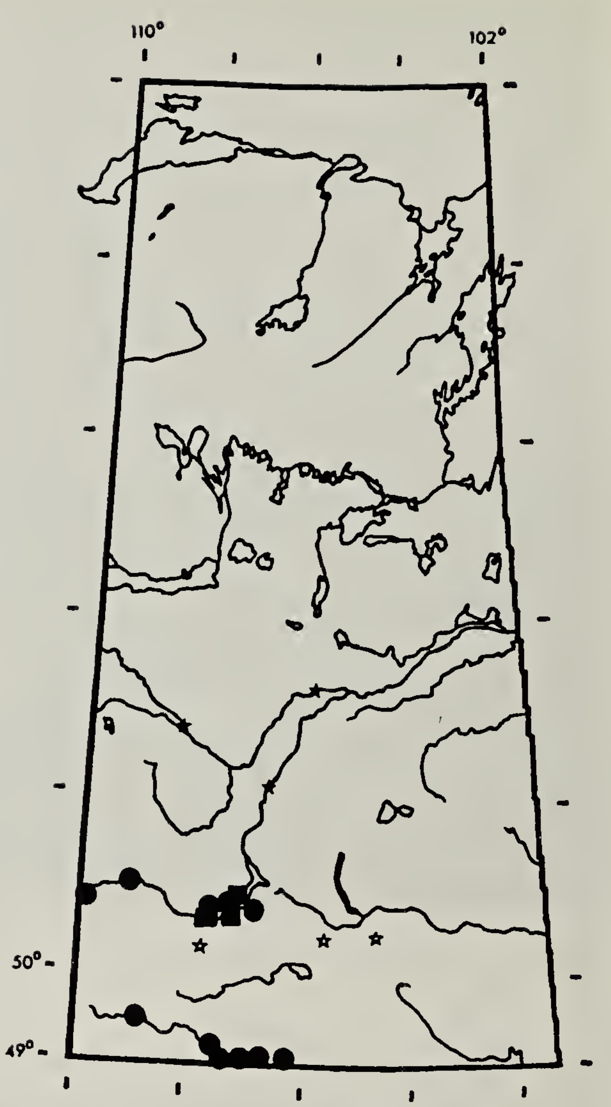

Figure 5. Distribution of Rush Pink (Stephanomeria runcinata) *in Saskatchewan.*
● *= previous populations*
■ *= new population*

May 1995, south of the University of Saskatchewan's Matador Research station about 20 miles (32 km) southeast of Kyle. Seventeen individuals were found on the south-facing, loamy side slope of a hill, near a small juniper-covered ravine. The site is 40 m southeast of the corner fence of S10 T20 R13 W3 of the Matador preserve. Interestingly enough, 20 Rush Pink plants were found in the exact same location.

When Saskatchewan Landing Provincial Park was visited on 19 July 1995, a second population of Western Hawk's-beard and a population of Rush Pink were discovered. A voucher specimen of Western Hawk's-beard was not collected due to the small population size; a photograph was taken instead. Neither of these plants had been found in the park before. Western Hawk's-beard was discovered in a moist, juniper-covered draw above an old road. Rush Pink was found at four different park locations on eroded, silty, south-facing slopes nearly bare of vegetation. In total, 28 Western Hawk's-beard plants and 800 Rush Pink plants were counted. More populations of these species are probably present in the park as many areas are still unexplored by botanists.

The third population of Western Hawk's-beard was located 11 miles (17.6 km) southeast of Beechy (S31 T20 R10 W3) on 22 May 1996. The habitat was a partly eroding, dry, southern slope along a coulee. The soil texture was sandy loam. About 330 individual plants were estimated to occur in this area. As well, approximately 200 Rush Pink plants were found in the same habitat.

Rush Pink

Rush Pink, a perennial composite, is found only in wet areas in the province: along the South Saskatchewan and Frenchman River valleys (Figure 5). This species looks very similar to the two native species of

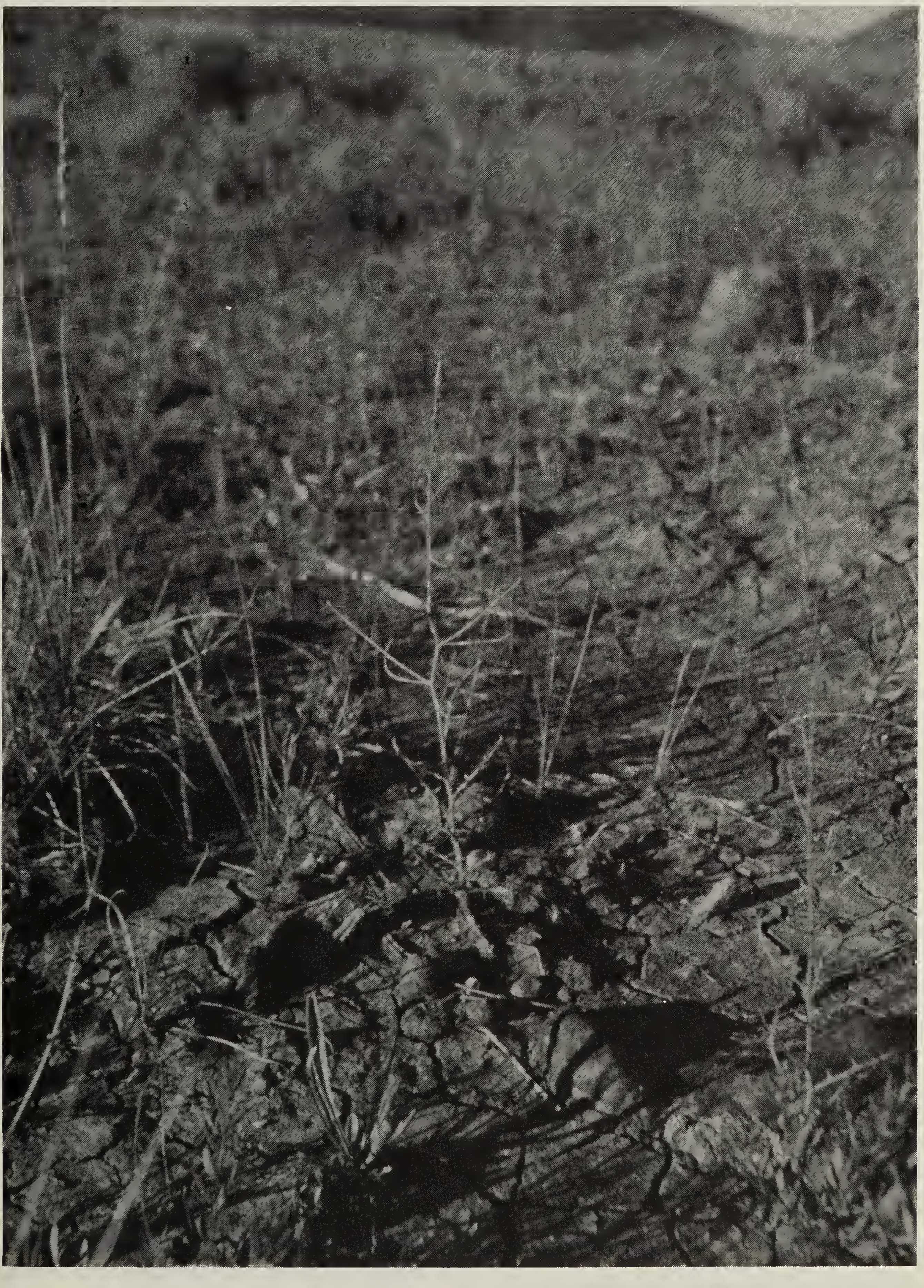

Figure 6. Rush Pink (Stephanomeria runcinata).

Skeletonweeds *(Lygodesmia juncea and L. rostrata).* All three species have mint green stems which exude milky juice, scale-like upper leaves and flowers with pink rays. The key to identifying Rush Pink is that the lower leaves are somewhat broader and toothed (Figure 6) than those of the Skeletonweeds, which have linear, untoothed leaves. Three of the five new populations of Rush Pink occurred in the same habitat as Western Hawk's-beard and are discussed in the previous section. The other Rush Pink populations were associated with *Cryptantha celosioides. C. celosioides* is listed as being a rare Saskatchewan plant in Harms et al. (1992). Until recently, it was considered to be a variety of Clustered Oreocarya (*C. nubigena).* The two species can be distinguished by the basal leaves. *C. celsioides* has egg-shaped basal leaves that are 5 to 8 mm wide while those of Clustered Oreocarya are narrower.

Rush Pink was located near the old Herbert Ferry (LSD9 S11 T20 R11 W3) on 22 May 1996. Approximately 50 individuals were found on a steep, eroding, loamy, south-facing slope of a butte near the river. Clustered Oreocarya was found on the top of this butte.

The fifth new population of Rush Pink was encountered on 28 May 1996, southwest of the Matador Field Station (S9 T20 R13 W3). Thirty individuals were found on the south-facing, sandy clay loam slopes of a coulee. Clustered Oreocarya was found on the same slope.

Conclusion

The South Saskatchewan River valley is a picturesque, biologically diverse area in our province. In addition to the many rare plants found here, the valley is home to deer, foxes, coyotes, cougars, birds of prey and songbirds. They are attracted by the abundance of water and lush vegetation. Unfortunately, the rough topography and lack of access points make the valley somewhat difficult to explore. Doubtless, there are many more populations of rare plants living there, waiting to be discovered.

Acknowledgements

I would like to thank the Prairie Ecosystem Study and the Heritage Foundation for their financial support of my research. Special thanks to Dr. Vernon Harms for his assistance in preparing this paper.

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The population of Loggerhead Shrikes in Alberta was recently estimated to be close to 5,000 pairs (Bjorge and Prescott, *Canadian Field Naturalist*).

MAMMALS

ADAPTATION ENABLES BATS TO FLOURISH

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This article originally appeared in the Saskatoon Sun.

Bats are the most diverse group of mammals inhabiting the world today. They represent nearly 25 per cent of all mammal species known. Their success is due to sophisticated adaptations such as ultrasonic echolocation, and flight. Flying at night when most of the world's birds are sleeping allows bats to take advantage of an almost unlimited food supply of beetles, moths and other insects, while avoiding many predators. All of Saskatchewan's eight species of regularly occurring bats are insectivorous.

Big Brown Bat *R.J. Long*

The Big Brown Bat, with a wing span of 30 cm, and the Little Brown Bat, with a wing span of 25 cm, are the two species most likely encountered by people in Saskatchewan.

Areas with older buildings and larger trees near water are preferred by bats. For some reason, brick buildings seem especially attractive. Their daytime sleeping quarters, called roosts, protect bats from the elements while they rest, digest their insect meals and raise their young. Female Little Brown Bats select warm dry sites, characteristics often met by building attics, while the males choose damper sites such as caves.

Incidentally, if you have unwanted bats as guests at your home or cottage, the best way to eliminate the problem is to plug the entrance to the roost in the evening after the bats fly out to feed.

Big and Little Brown Bats roost in small colonies. Several species of solitary forest dwelling bats have a patterned coloration of the fur resembling dead leaves and lichens, which is thought to provide camouflage for bats roosting in trees. The Silver-haired and Hoary bats prefer to roost in spruce trees and the Red Bat roosts in deciduous trees.

Each autumn most of Saskatchewan's bats make an invisible migration south to warmer climates. At least one species, the Big Brown Bat, regularly hibernates in Saskatchewan. While it tolerates the cold better than other species, little is known of the details of its winter roosting habits. Rarely, during a mild spell or when disturbed, these bats are seen flying when there is snow on the ground.

"YOUNG BIRDER OF THE YEAR" COMPETITION HELPS KIDS TAKE NOTE OF NATURE

A new, year-long competition is being launched today that encourages young birders to develop their birding skills by keeping a field notebook for one year. The competition is being launched by the American Birding Association and Leica Sport Optics.

Entrants will be asked to keep a field notebook and write several essays over the course of a year. Notebooks will be judged by a panel of birding experts next spring who will look for the greatest improvements in birding techniques, including observation skills, field sketching, and creativity. Entrants will be judged in three age categories: 10-12 years, 13-15 years, and 16-18 years.

ABA's Executive Director Greg Butcher said of the competition, "ABA is committed to supporting the interests of young birders through education programs that develop the skills of detailed and accurate observation and record keeping. These skills will serve birders well for the rest of their lives."

First prize in each category includes a pair of Leica 8X32 BA Ultra Binoculars and a scholarship to attend a field ornithology summer camp in the Rockies. Entry fees for the competition are $15.00 for ABA members, or $20.00 for non-members, and include a Registration Packet containing an ABA Field Notebook, the National Geographic Society's *Field Guide to the Birds of North America*, and the ABA youth newsletter *A Bird's-Eye View*.

In the United States in 1991, an estimated 65 million people fed birds, and 54 million reported watching wildlife around their homes. Of these, about 51 million were "backyard" birdwatchers. (USDI Survey, 1993) In a 1990 survey, twice as many vacationers preferred to watch birds than play golf! (Fortune, 1990)

The American Birding Association is an international non-profit birding and bird conservation organization headquartered in Colorado Springs, Colorado. ABA provides leadership to field birders by increasing their knowledge, skills, and enjoyment of birding, and by contributing to bird conservation. To learn more about membership in the ABA, or to request a 'Young Birder of the Year' registration packet, contact Paul Green at (719) 578-9703, email paulgrn@aba.org, or visit the ABA web site and www.americanbirding.org.

Leica Sport Optics is the premier supplier of optics equipment to the birding market and is based in Northvale, NJ. For further information contact Terry Moore @ (201) 767-7500.

(*Editor's note: To help support the ABA's initiative to encourage young people to develop as naturalists Nature Saskatchewan will pay the entry fees for up to three people, one from each age group. Please contact the executive for details.*)

HOOKING MORTALITY OF YELLOW PERCH FROM EMMA LAKE, SASKATCHEWAN

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The primary purpose of fishing with a hook and line has changed over the years from a means of obtaining food to a form of recreation.[9] Many management practises have incorporated the idea of "catch and release" fishing in areas of low population numbers or in areas of high fishing pressure so that a particular dish may be caught more than once. The Cheesman canyon, on the South Platte River, Colorado, was declared a "no-kill" area to protect the populations of rainbow Trout *(Oncorhynchus mykiss)* and Brown Trout *(Salmo trutta)*.[1] For most species there are daily and possession limits to protect population numbers. In addition, there are size restrictions to protect the most effective breeders in a system. For example, the current limit of walleye *(Stizostedion vitreum)* in Saskatchewan is five fish, with a possession limit of ten fish.[8] Recently in Tobin Lake, Saskatchewan, a "no-keep" regulation for walleye ranging in size from 54-69 cm has been installed to protect the breeding population.[4]

These regulations require that many fish must be returned to the water after being caught. This led to concerns as to the fate of the released fish, as these regulations are only effective if the fish survive. A large number of assessments have been conducted in this area. However, most of the literature concentrates on salmonids[2,3,10] and centrarchids.[1,6,9] I found a few studies involving Walleye,[5,7] a member of the perch family (Percidae), but I encountered none pertaining to Yellow Perch *(Perca flavescens)*. The purpose of this study was to determine the percentage of "hooking mortality" that occurs in this species. It should be noted, however, that the results of this study will likely represent the low range of expected hooking mortality, as the experimental fish were artificially hooked by hand in a superficial location.

Methods This study was conducted at Emma Lake, Saskatchewan, in late August of 1994. Emma Lake is located near the south-east border of Prince Albert National Park, in the boreal forest — aspen parkland ecotone. During the course of this study, the mean water temperature was 20.0°C and the oxygen content was 8.5 ppm, and the shallow lake (maximum depth of 2.5 m) was not stratified with respect to these parameters.

Two experiments were conducted. Mortality was assessed after 24 and 48 hours, in the first and second experiments, respectively. Fish were classified as dead or alive. Yellow perch were captured with a seine net and transferred to holding pens within 15 minutes of capture. Fish were recaught with dip nets from the holding pens and hooked artificially by hand three times with a single barbed hook. The location of hooking consisted of twice in the lower jaw or floor of the mouth and once in the upper jaw, resulting in some tissue tearing but very little or no bleeding in most cases. Fish were also 'dangled' by the hook for approximately three seconds to simulate being pulled from the water. Some fish were kept as a control, and were not subjected to hooking or additional handling. During the containment period, both groups were fed *Gammarus* spp., *Hyallela* spp., and other aquatic invertebrates twice daily, which were obtained from Emma Lake.

Results The 24-hour experiment involved 30 hooked and 25 control fish; no mortality was observed. The 48-hour experiment involved 25 hooked and 25 control fish. One individual in this experiment died, resulting in a mortality of 4.0%. This was not statistically significant ($X^2=0.04$, df=1, $P>0.05$).

Discussion The low mortality observed in Yellow Perch indicates that fish hooked in a superficial location have a good chance of survival upon being released. There may be, however, some biases in this study, the primary one being with the method of hooking. Under natural conditions, fish will become hooked occasionally in more internal, vital areas, such as the tongue, gills, esophagus, and eye. This will lead to increased mortality. For example, Warner (1979) found that mortality occurred in 43.5% and 24.2% of Atlantic Salmon *(Salmo salar)* hooked in the gill/gill arch and esophagus regions, respectively.

This sharply contrasts with the lesser mortality observed when the salmon were hooked in superficial areas, such as the jaws and roof of the mouth (8.1% mortality), eye (6.4%), and tongue/isthmus (9.7%). However, the results of this study are consistent with studies in which fish were hooked in superficial areas.[3,6,10]

Mortality may have been underestimated, as fish were only monitored for a maximum of 48 hours; their survival after this time is unknown. However, in a study involving cutthroat trout *(Oncorhynchus clarki)*, Hunsaker *et al.* (1970) found that mortality was complete in 48 hours.

The control groups were important in ruling out other possible causes of mortality, if a higher percentage of mortality had occurred. Sources of stress may include that resulting from the seining and handling techniques, being held in a pen, and possible food deprivation. Because no mortality occurred in the control groups, these sources of stress did not significantly harm the fish in the short term.

This study could be improved by including a number of other variables, most obviously by using a natural method of hooking. Additionally, anatomical hooking site,[2,3,6] gear type,[2,5,9] and temperature[2] are factors that have been found to influence hooking mortality of fish. This study is consistent with findings in earlier studies in the literature and reports on a species not previously examined in a more northern climate.

Acknowledgments This study was carried out as part of a requirement for an Honours Field Course (held at Emma Lake) of the Department of Biology, University of Saskatchewan. I would like to thank the Department of Biology, especially J.K. Schmutz, R.J.F. Smith, and S. Halpin. Appreciation is also due to R. Stinson and J. Bantle for help with the field work.

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* * *

Sandhill Cranes *KL Photo*

INSECTS AND OTHERS

TICKS AND LYME DISEASE

ROY JOHN, 754 Woodpark Road S.W., Calgary, AB T2W 2S4

Dealing with ticks becomes a way of life when...

I have taken nature trips along the east coast of Canada and the U.S. since the late 1960s. My dog of that time introduced me to a close relative of the spiders, ticks. I learnt from the locals how to recognize and deal with these pests. In the early 1970s I began organizing trips to see the rich and varied wildlife, particularly of New Jersey. Ticks became a way of life.

In 1975 a tick-borne disease was reported in humans. It was called Lyme disease after the site of its first discovery, Old Lyme, Connecticut. I slowly became more aware of this problem and developed a real concern when I led a trip of 40 people to New Jersey in the mid 1980s.

There are about 300 species of ticks worldwide. They can be roughly divided into two groups, the soft and hard ticks. Both can be a problem for humans, but it is the hard ticks that transmit Lyme disease. A typical tick is a few millimetres long, has a large roundish body topped by a tiny head and eight legs. At first it was thought that only one species of tick carried the disease. This is not true, so it is important to know something about the common tick species.

For simplicity we can divide our ticks into two groups, which I will call "Wood" and "Deer" ticks. The Wood ticks include the Wood Tick, *Dermacentor andersoni*, American Dog Tick, *D. variablis*, Lone-Star Tick, *Amblyomma americanum* and the Brown Dog Tick, *Rhipicephalus sanguineus*. These ticks are about one and a half to twice the size of the capital letter "O" in this article and, unfed, they are as thick as a Christmas card. They are brown and somewhat square. These are the most abundant of the two groups.

The second group is the Deer ticks, *Ixodes scapularis*, *I. dammini* and *I. pacificus*, all called Deer Ticks. These are much smaller ticks, the size of a lower case "o" or smaller, brown and teardrop shaped. A researcher at Georgia University, Dr. Oliver has proved that the *Ixodes scapularis* and the *Ixodes dammini* were the same, with the northern version varying only in colour. Since then *Ixodes dammini* and *Ixodes scapularis* are combined as *I. scapularis.*

Lyme disease is caused by a spiral-shaped bacterium (a spirochaete), *Borrelia burgdorferi*, named for Willy Burgdorfer who isolated the Lyme spirochete in 1982. This bacterium is allied to those that cause relapsing fever and syphilis. The typical symptoms of infection are a "bull's eye" rash — a red spot where the tick was attached, encircled by a broad red ring, called an Erythema Migrans. This can appear days to weeks after a bite. Other symptoms include fever, headache, dizziness and fatigue. Joints, especially knees, can become swollen and painful. In severe untreated cases, arthritis, heart arrhythmia and paralysis can result. However, keep in mind that only 50% get the rash. It is terribly misleading to think you do not have Lyme disease because you do not have a rash. Besides the general achiness of the early onset of Lyme disease, the symptoms are completely individualistic and host determined. Each patient has a unique set of symptoms and should not discard the possibility of Lyme disease if they do not fit the general pattern.

Lyme disease is treatable with antibiotics *as long as it is caught at the early stages.* Although tetracycline was believed to be the "cure" for Lyme disease when it was first "discovered" in 1975, it was later proven ineffective (unfortunately many people are still using this drug). Because the bacterium can hide in the central nervous system, severe cases are treated with ceftriaxone that penetrates the blood-brain barrier.

At first the disease was confined to the eastern U.S. seaboard, but it is now found throughout most of North America. It was probably spread by migrating birds (the theory as to its arrival in North America in the first place) or by people transporting pets around the country (or both). If any Lyme disease-free areas exist they will not last long. You cannot escape the disease by leaving the country. It occurs in Europe, the former Soviet Union and the Orient too. Indeed the only place that Lyme disease does not exist is on the two Poles where it is too cold (or in a Saskatchewan winter!). There is now Lyme disease on every continent and island on this earth.

The best defence is prevention. The usual first step is to avoid going into woods and grass, not a real option for naturalists! You can wear light-coloured clothing to make these beasts more visible, especially in the peak tick season of June and July. However, ticks are a problem 12 months a year in much of North America, something to remember when going on a winter vacation. Tuck your pants into your socks and wear long-sleeved shirts. Check yourself and your companions from time to time. I had originally believed that DEET-containing repellents were a good control. About 3-4 years ago in the July issue, *Consumer Reports* stated that DEET was ineffective against ticks. They are hungry and aggressive and ignore the fact that the repellant makes you smell bad. The only effective chemical against the tick is Permethrin sold in cans (same chemical as used in Lice shampoos). This product is sprayed on clothing. Once dried the chemical acts as a mite repellant (or acaracide). Since the ticks wander, the hope is that it will die on contact as it wanders passed an item of treated clothing even if the victim is wearing shorts. This chemical stays on the clothing until agitated out in the wash. It will not come off if the wearer sweats. The spray is useless on skin since it breaks down on skin within 20 minutes.

Ticks often wander for several hours looking for an ideal spot to feed so they can frequently be picked off before they burrow in. Shower after being out and check yourself thoroughly. Remember to check behind your ears and in your belly button — just like your Mother said. If you are vigilant or lucky enough to find it before it transmits any of the bacteria (it can happen any time during the feeding process) the bacteria can still be forced into the blood stream if the tick is improperly removed. I have generally found them at my belt line although a few have been in my hair. Since the mouth includes a barbed part and the tick forms a cement seal to keep it in place as it is feeding, removal is very difficult. If you discover an embedded tick I have found the best method is to pull at the mouth parts by sliding fine tweezers under the body and grabbing at the mouth. Gently pull with fine tweezers until the tick comes free and clean the area with an antibiotic cream. You might lose some skin and sometimes the head breaks off and remains imbedded. Although not the most pleasant result, it runs the same risk as getting a splinter. It does not increase the chance of getting Lyme disease. Just be patient and keep pulling gently. I used to believe you had to paint them with nail polish and fill their breathing holes to suffocate them. If you smother a tick it will relax and retract, however, it puts you at GREAT risk. When an organism dies, it relaxes and releases its body fluids. That includes the bacteria residing in the gut of the tick. A similar reaction occurs if you squeeze the tick's body.

I pulled a live tick (picked up at Beaver Creek, just south of Saskatoon) off my back two years ago. I left in a piece of the mouth and within a few days I had a hard, itchy lump. My physician physically removed the problem, but the itch and pink mark remained for some months. You should keep the tick for identification (I trap them between two layers of clear sticky tape) in case you begin to show symptoms. Remember deer ticks are so small they can easily be missed. Unfortunately the symptoms can be confused with many other diseases and this has led to many misdiagnoses.

Ticks prey on a variety of animals from mice to deer to humans. Ticks normally feed for a couple of days, during which time they swell to many times their normal size (still not very large for a deer tick). Then they drop off their host and continue their four stage life cycle. As they progress through larvae and nymph to adult they climb up vegetation and wait for a victim. When an animal or person brushes by they grab the fur or clothing and hang on. Fortunately not all ticks carry infection and it takes quite a time before the tick finds the right place, becomes imbedded and transmits the bacteria. This means a vigilant person should have no problem. However, if in doubt consult your physician. Ticks also cause Rocky Mountain spotted fever, tick paralysis and ulcerated sores.

There is a close relative of the ticks that only reaches Canada in southern Ontario. This is the Chigger, a microscopic mite that feeds on cell fluid, not blood. I am not aware of any disease associated with Chiggers. Unfortunately they hatch in groups of hundreds. As humans are not their normal host they die within a day or two of burrowing into our skin. The reaction this causes itches unmercifully. Be prepared for a couple of weeks of sleepless nights!

Remember your pets and livestock can suffer too. Check them as well as you would yourself. If the animal shows signs of stiffness or fever consult your veterinarian. There is a vaccine for dogs (but not for humans).

I want to thank Dr. Carol Stolow, Director, Lyme Disease Network of New Jersey for her help in preparing this article and clearing up some of my own misconceptions.

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FOLLOW THE ARC TO ARCTURUS

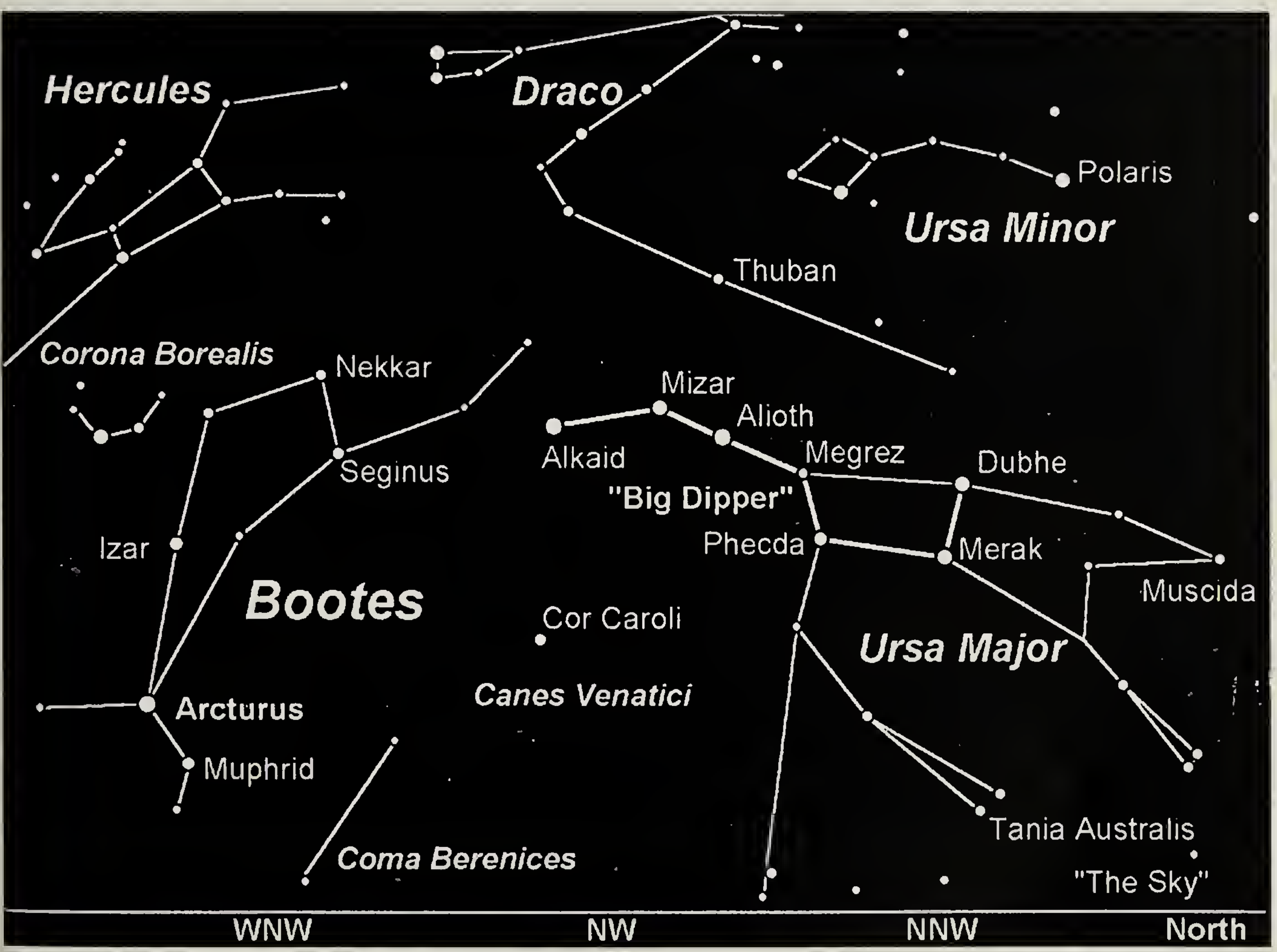
STAN SHADICK, 4 - 1008 Temperance St., Saskatoon, SK S7N 0N6

Editor's note: Stan Shadick is an astronomy lecturer at the University of Saskatchewan and author of the 1998 Canadian Skywatcher's Trivia Calendar.

The seven stars of the Big Dipper form a well-known stellar pattern in our northern skies. This famous asterism forms the tail and hindquarters of Ursa Major, the Great Bear. Muscida emblazons the bear's nose and Tania Australis marks one of its hind legs.

During the night, as Earth spins on its axis, Bootes, the herdsman chases this celestial bear around Polaris, the North Star. Shortly after nightfall on an autumn evening, if you find the curved handle of the Big Dipper and follow the curve of its arc beyond the handle's end, you will locate Arcturus, the brightest star of Bootes constellation.

Arcturus is a giant in comparison to our Sun. Its volume is large enough to swallow 65,000 suns, yet its mass is only 4 times heavier than our sun. This star is a stellar senior citizen, having consumed its supply of hydrogen fuel that powered its central nuclear furnace during its



Bootes and Ursa Major above northwestern horizon about 2 hours after sunset from September through November.

youth. The loss of core fuel led to a dramatic reorganization of the star's internal structure. Its core collapsed and a shell of remaining hydrogen surrounding the core ignited, causing the surface of the star to expand to its present diameter of 32 million km.

Our solar system is a resident of one spiral arm of the great Milky Way galaxy. Most stars visible in the night sky are neighbours that follow us, like horses on a merry-go-round, as we orbit the centre of the Milky Way.

Arcturus is an exception. It is not a true member of our spiral arm, but an alien visitor from the more distant halo population of stars that envelopes the spiral arms like a swarm of bees. These halo stars are much older than our neighbours and are thought to represent a generation of stars that formed soon after the birth of our galaxy, over 10 billion years ago. By contrast, the Sun is relatively young, only 4.6 billion years old.

Presently only 36 light-years away, Arcturus is speeding towards us at 540,000 km/h. In the distant future, it will swing past us and shift into Virgo constellation where it will continue on its journey to rejoin other members of the halo population.

* * *

Saskatchewan's largest tree — a Black Poplar near Waldheim *John Bond*

THE OLD MAN ON HIS BACK PRAIRIE AND HERITAGE CONSERVATION AREA

SHARON BUTALA, Eastend, SK S0N 0T0

For more than thirty years my husband Peter mulled over in his mind a way that would permit him to retire, preferably with money in the bank, since ranchers don't get pensions, that would let him keep all 13,108 acres of his grassland ranch whole and unploughed. It looked impossible: nobody could afford to buy a place so big just to raise cattle, it was all arable, so farmers looked longingly at it, and all potential buyers could be expected either to plough it up, to overgraze it in order to pay the bills, or sell it off in parcels to different buyers and thus destroy it. Peter was determined that there had to be a way to preserve a ranch first settled by his uncles in 1913, and expanded by them and by his father over the years to its present size and shape, until Peter took it over in 1965.

Together we approached several agencies whose mandate was conservation, but nobody seemed to be at all interested in it, until finally more than a year after our inquiry, the Nature Conservancy of Canada wrote to us to ask for more information. It took close to three years and something like five lawyers and reams of paper, not to mention visits to the ranch by experts of every stripe: ornithologists, ecologists, botanists, wildlife biologists — the mind boggles. In the end they all agreed: this was a place worth saving.

It is a part of the Great Plains of North America, unbroken rolling plains with a typical elevation of about 3200 feet, technically mixed-grass prairie, in the brown soils zone, mostly of Class 4 and 5, but with a little Class 3 and a little Class 6 soil. All the usual species of birds and grassland animals — from coyote to deer and antelope — make their home there. Wayne Harris spotted a swift fox den, and Frank Switzer — well, it's hopeless for me to try to name the birds he photographed, but he seemed pretty happy afterward. We know there are loggerhead shrikes, burrowing owls, ferruginous hawks, golden eagles and horned larks. You'd be hard-pressed to find a more stunningly beautiful sweep of unploughed grassland, and for us, at least, this is what is most precious: that it is largely unbroken and covered with a healthy stand of native grass that is mostly clear of trees, buildings, a lot of fences, of evidences in general of the presence and influence of humans.

There are, however, many stone circles and other, more complicated stone forms, built sometime in the last ten thousand years since the glaciers retreated, by aboriginal people, and all of which deserve further investigation by archaeologists. They add to the mystery of the place and to its spiritual value, since its worth

Landscape near Butala ranch *Stephanie John*

goes far beyond its capacity as an agricultural tract or even a wildlife preserve.

In the meantime, behind the scenes, the Nature Conservancy was hard at work approaching potential partners in ownership of what they hoped would be a new grasslands preserve. A professional assessor was employed, who spent a week driving and walking over the place, photographing and measuring, and then with his nose buried in government documents and land titles and who knows what all, before he came up with a price deemed by all involved to be fair market value. This was $600,000 (which in fact, in view of the purchase price of over $300,000 since then of a place something like a fifth of the new preserve's size, looks pretty puny). The Old Man On His Back Shortgrass Prairie and Heritage reserve was born. (The name has since been changed to The Old Man On His Back Prairie and Heritage Conservation Area.)

The new owners of the deeded land are the Nature Conservancy of Canada and Saskatchewan Environment and Resource Management, and Saskatchewan Agriculture and Food is the administrative authority of the leased land which is then leased by the Nature Conservancy, which, in turn, has leased it back to Peter Butala for a period of five years. (The Conservation Area is still a ranch and will be for up to the next five years.) The total project budget is $950,000, which came from SaskPower ($350,000 over two years), SERM's Fish and Wildlife Development Fund ($250,000), Environment Canada's Canadian Wildlife Service ($150,000), Saskatchewan Wildlife Federation ($40,000), the Butala's donation of $100,000 in land, and the Eden Trust and private donors making up the balance.

On 18 July 1996 a ceremony was held on the land led by the Elders of the Nikaneet Reserve, (north of the Conservation Area in the Cypress Hills). This was followed by prayers led by elder Gordon Oakes, a feast, a few brief speeches, entertainment by young violinists Ben and Rebecca Beveridge of Saskatoon, and a Round Dance in which everyone (but two or three individuals) took part. The feeling in the hall at this point was so, for lack of a better word, warm, that in such a brief account words fail even a novelist. The Spirits of the Land, or of the Ancient People whose land it once was were felt by some to have been present.

The Farm Land Security Board has specified that there be no net loss in agricultural productivity which suits us, since it was Peter's abstemious ranching practices which kept the grass in good condition in the first place so that it could be turned into a conservation area. The challenge, as John Grant of The Nature Conservancy has said, is to do something innovative and at the same time of value to the local community. Peter would love to see bison running there again one day, and I am curious about a prairie restoration project, but such possibilities are still being discussed.

An advisory committee was established consisting of local people representing various interests — tourism and the rural municipality, the Saskatchewan Stockgrowers, the oil company working in the area — plus representatives of the owners, (various branches of SERM and Sask. Agriculture and Food, and the Nature Conservancy) the leasees, and SaskPower representatives. Two meetings have so far been held, positions have been stated, subcommittees established, and the aims and possibilities of the Conservation Area are slowly being worked out. It is established that this is an opportunity to demonstrate the extent to which conservation and grazing interests can work together and benefit each other, and that the project is capable of being, and is intended to be, of great benefit to the local community. The first step will be a comprehensive survey and inventory of the flora and fauna to establish a base of information from which to determine policies, research directions, and community involvement. This will be begun as soon as possible.

There are bound to be tensions and sometimes conflicts when these various interest groups try to work together, but the effort to find common ground so as to serve each interest without destroying or damaging any other interest is one well worth making and in this regard, this project has the potential to break new ground, and to be an invaluable demonstration project for other endeavours of this kind.

The Ruby-throated Hummingbird's wings beat 55 times per second when hovering, 61 times per second when backing up, and 75 times per second when flying forward.

In 1911, some ducks shot in Western Nebraska had small nuggets of gold in their gizzards, thus causing a gold rush.

GOSHAWK'S LAW

SYLFEST MULDAL, Kingston, ON

Reprinted, with permission, from "Blue Bill," *Journal of the Kingston Field Naturalists, Ontario.*

Let's suppose you're now at this game, and you're keen. Having seen those magnificent slow motion eagles on TV, and then those tiny birds flitting over your garden in such a hurry, you can't wait to learn bird identification. I think it's time for you to come on a field trip. You'll get quite an education from us experienced birders. Yes, I should explain; we are birders not birdwatchers. This is because we don't necessarily *watch* birds; we just "bird." But don't be shy. Even I was ignorant once. Still, the way birdwatching is done may be a little confusing to you at first. So let me walk you through the experience, and explain a little of the "behind the experience" as we go.

Soon after you leave the car park and head off along the trail, you'll likely notice something odd. The experienced birders in the group pay no attention whatsoever to all the obvious birds that you see around you. Crows, herons, and blackbirds fly constantly by, but no one says a word. The hike rambles on in silence. What's going on?

Well, it's a funny thing, but these are not actually real birds. Herons, for instance: everyone knows what a heron is, even non-birdwatchers. Herons go without saying. Then there's crows and blackbirds: they are more a kind of pest, not a kind of wildlife, if you see what I mean. It may be slowly dawning on you by now that none of the birds you have come to know and admire in your garden are proper birds at all. They're ... garden birds. (Later, you will discover that garden birds become real for just one day each year. But you have never been on a Christmas Count, so you don't know that yet.)

Chickadees aren't quite pests, but they are, well, too obvious. Their calls are loud and foolish, and they are suspiciously tame around people. You should think of them as a kind of background diversion, to make the real birds harder to spot. Suppose you're searching for a bird among the leafy branches. If you can't see it, it might be anything. If you can see it, it's bound to be a chickadee.

Now, the rules of etiquette forbid birders from identifying common birds out loud. That would amount to an insult to the listener. So by remaining silent, your companions are merely showing respect.

Real birds will be announced from time to time during the walk. They have names like "Yellow-throated!" "Wilson's!" and "Least!" You will not find these names in your field guide, and you may indeed notice that noone else has brought a field guide, but whenever one is called, the experienced birders all point their binoculars in a certain direction and murmur, like members of a devout sect on a wilderness pilgrimage.

By now, you realize that bird identification is more complicated than you had thought. You refrain from

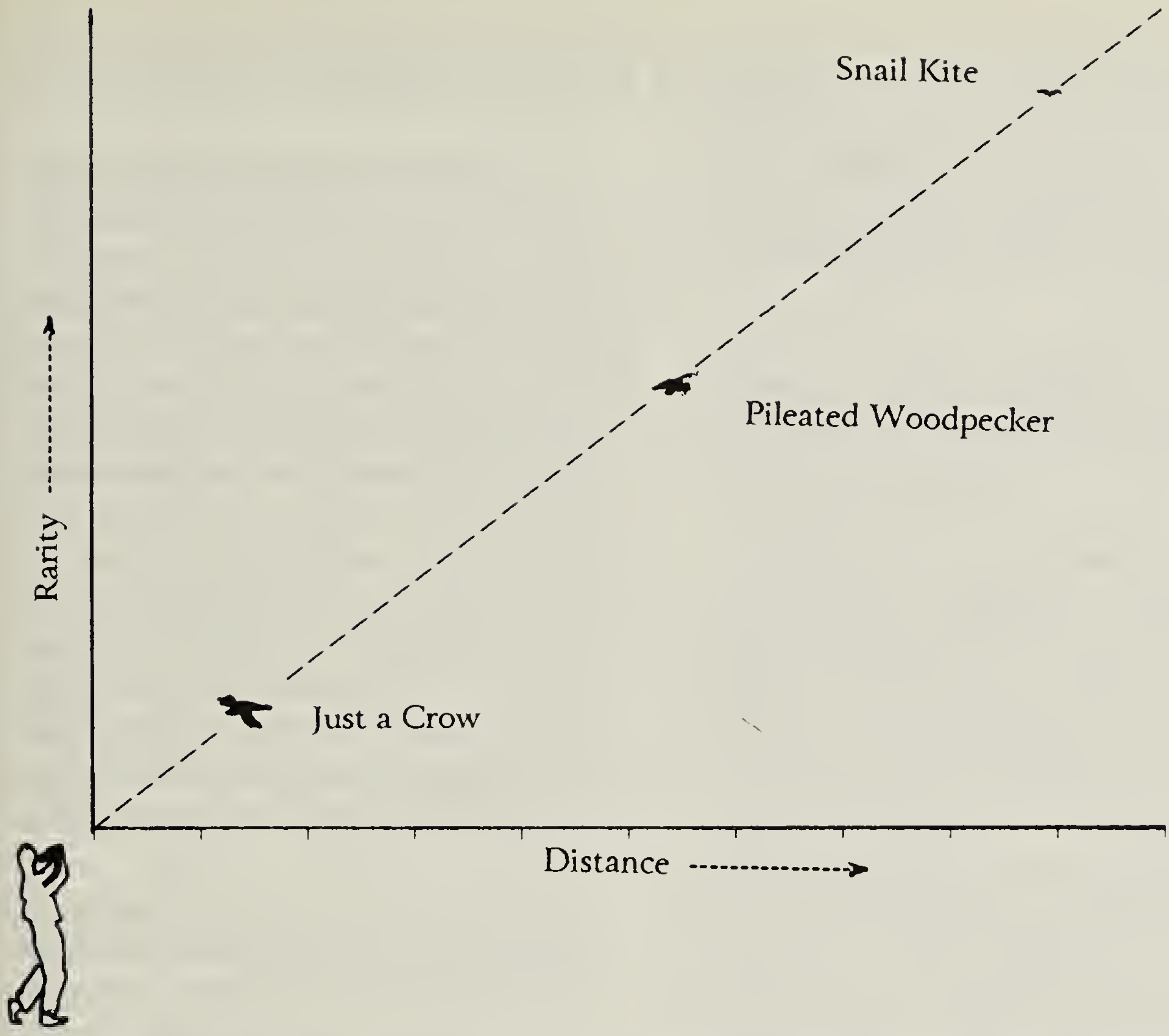


Figure 1. Illustration of Goshawk's Law. The species trajectory of an approaching bird is shown.

pointing out anything or asking for help, because you don't know if what you're looking at is even a real bird at all. So you take your cue from the experienced leader, who has stopped and is peering through binoculars w-a-y into the distance. You peer, and gradually, a speck becomes visible in the sky moving towards you. If only you could keep those binoculars steady ... as you struggle, the leader lowers his glasses, and continues down the trail without saying anything. But you persevere, and watch, as the steadily-flying bird passes overhead. It would seem to be a crow.

How can we explain what just happened? Why did the leader stare at the crow? Well, strange as it may sound, non-birds such as crows become real *at a distance*. And the further away they are, the more extraordinary they become. Scientists in the field of quantum ornithology recognize this phenomenon as Goshawk's Law of Birding. The theoretical background is complex, but this is the gist of it: *the further away a bird is, the rarer it gets.*

As crows recede into the distance they become indistinguishable from, say, peregrines. Similarly, peregrines might as well be Kirtland's warblers provided they are sufficiently far away. Technically, they are said to acquire "rarity potential." If you think about it, this makes obvious sense, since rare birds are spread out more thinly, and so on average they are farther away from you.[1]

At extreme distances, there is simply no scientific way to distinguish bird X from, say, an Eskimo Curlew, and we are bound to include it in the "provisional set" of Eskimo Curlews. Some quantum ornithologists extend the argument further, and claim — the speed of light being what it is, and so on — that if the distance is great enough, even extinct birds such as Great Auks should be glimpsed in flight by experienced observers.

Our field-trip leader stopped watching the distant bird because, in flying closer, it had become common. Now you will see his wisdom in keeping silent and *not* labelling the bird as any particular species. That would have been merely confusing, since the bird's identity was not fixed but changing. (See Figure 1) It had, in fact, as it came *very* close, become a non-bird. We'll return to the hike, where our leader pauses again, and thoughtfully cocks his head. He seems to be listening to a very small noise. Goshawk's law applies equally well to sounds, and also to bad viewing conditions, thick vegetation, and so on. A bird that can hardly be seen has high rarity potential; there is no scientific basis for not identifying it as something terrifically rare. "A bird in the hand is worth two in the bush" is simply not true in quantum ornithology: any bird in your hand is *bound* to be a chickadee.

Quantum ornithology finds its purest application in the advanced discipline of "seawatching" (which most of the time, by the way, is precisely that). Seawatchers look for birds from the shores of seas and other large bodies of water. They identify birds far, far away, sometimes even in different countries. Furthermore, since pelagic seabirds fly closer to the lee shore in severe storms, seawatchers favour foul days and high seas. Under such poor viewing conditions, sometimes called "extreme birding," the rarity potential of any bird will be huge, and anything is possible.

So when you're on your first field trip, and you can't see what the others are seeing, and you don't know what's going on, don't despair. That mystery, you see, is the essence and the sport of it.`

This truth is familiar to all mothers. When their children get too close, they say, "Make yourself scarce."

The Grey Fox has the unique habit of climbing trees. It was once common in southern Manitoba and has recently reappeared after an absence of 300 years.

The Grizzly Bear once ranged as far east as the Red River Valley, Manitoba.

The last Canadian record of a Black-footed Ferret is from Climax, Saskatchewan, on 7 December 1937.

In pioneer times a wedding present with birds on it was considered bad luck; it was thought the couple's happiness would fly away.

NOTES AND LETTERS

BREWSTER'S WARBLER IN SASKATOON

Many birders consider warblers to be the creme de la creme of the world of birds. Their vivid colour patterns make most individuals of this subfamily of birds particularly attractive when the birder is lucky enough to obtain a good view. In the Saskatoon area, warbler-watching during spring migration depends greatly upon the weather. When the weather has been warm and sunny and the nights clear, then most warblers bypass our city. Warbler aficionados await spring rains when stormy weather overnight sends flocks of warblers to city parks and residential areas for shelter.

On the weekend of 24 & 25 May, 1997 frequent intervals of rain brought a good variety of songbirds to the Saskatoon district. Following 18 hours of non-stop birding on our annual May Day Bird Count, I was rather tired on Sunday morning but woke in time to join Patrick Bulman as he led a Saskatoon Nature Society field hike along the Meewasin Trail atop the riverbank of the South Saskatchewan River in Saskatoon.

As we passed the hilltop on the riverbank next to the university president's residence, Patrick called my attention to an unusual warbler sitting in the open on the edge of some shrubbery at a distance of about 3 m. The warbler had a yellow crown, bluish-gray back, white underparts with a smudge of yellow on the breast and two yellow wingbars. These characteristics immediately identified it as a Brewster's Warbler, a type of warbler I had previously never had the privilege to observe.

The Brewster's Warbler is not a unique species but the more common hybrid of two rare Saskatchewan species, the Golden-winged Warbler and Blue-winged Warbler. A less frequent hybrid with genetically recessive characteristics is called the Lawrence's Warbler.

The Golden-winged Warbler nests regularly as far west as Manitoba's Riding Mountain National Park. There are 14 Saskatchewan records listed in the *Atlas of Saskatchewan Birds*, of which two showed up in the Saskatoon region. The Blue-winged Warbler regularly nests no closer than south-eastern Minnesota and only four Saskatchewan sightings are listed in the Saskatchewan atlas. According to the newly published bird guide *All the Birds of North America* the Blue-winged Warbler is "increasing to north" whereas the Golden-winged Warbler is "seriously declining by displacement and hybridization with blue-winged warbler." These comments suggest that Saskatchewan birders may look forward to discovering more hybrids of these two species straying into this province in future years.

1. Smith, Alan. 1996. Atlas of Saskatchewan Birds. Special Publication No. 22, Nature Saskatchewan, Regina.
2. Griggs, Jack. 1997. All the Birds of North America. Harper Perennial, New York.
3. Farrand, John. 1983. The Audubon Society Master Guide to Birding, Volume 3. Alfred Knopf Inc., New York.

- STAN SHADICK, 304-1008 Temperance St., Saskatoon, SK S7N 0N6

LONG-EARED OWL SNAGGED ON BARBED-WIRE FENCE

Recent summaries of bird deaths on barbed-wire fences, while listing many species of diurnal and nocturnal raptors, fail to mention that the long-eared owl is "locally common in woods near open country." They often exist in close association with such fences and some snagging- or hanging-related deaths would be expected.[1,2]

Long-eared Owl *Wayne Lynch*

On 16 July 1993 we discovered a dead long-eared owl hanging from a barbed-wire fence near Villa Grove, along U.S. Highway 285, in the San Luis Valley of south central Colorado. The owl was caught on a barb by its left wing and apparently hung, suspended freely, until its death. We estimated the bird had been dead 5-7 days. This specimen, although collected, was later lost to scavengers, precluding sex determination or aging. Given the season and the inexperience of young of the year, however, it is reasonable to suspect that the owl was a recent fledgling.

As owl authority Denver Holt has pointed out (personal communication), wildlife deaths due to encounters with fences are really no different from other forms of human-related mortality such as electrocution, poisoning, collisions with automobiles, power lines, or windows, etc. The significance of barbed-wire related deaths, while likely minor, would more fully be appreciated with quantifiable data from surveys similar in design to those used for assessing power line- and radio tower-related mortality.

Special thanks are extended to Robert Nero, who thoughtfully provided information on barbed-wire fence related deaths, and to Richard Reynolds and Denver Holt for manuscript review.

1. Allen, George T. and Pedro Ramirez. 1990 A review of bird deaths on barbed-wire fences. *Wilson Bull.* 102(3):553-558

2. Nero, Robert W. Northern flying squirrel and red bat caught on barbed-wire. 1993. *Blue Jay* 51(4):215-216

- JAY W. TISCHENDORF* AND CHARLES L. JOHNSON, United States Forest Service, Rocky Mountain Forest and Range Experiment Station, 240 West Prospect Road, Fort Collins, Colorado 80526 U.S.A.
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SOME INTERESTING OBSERVATIONS OF LADY'S SLIPPER ORCHIDS DURING FIELD STUDIES IN MANITOBA

Field studies carried out on native Lady's Slipper Orchids (*Cypripidiums*) in south-eastern Manitoba over the last 20 years have allowed the authors to observe several interesting things.

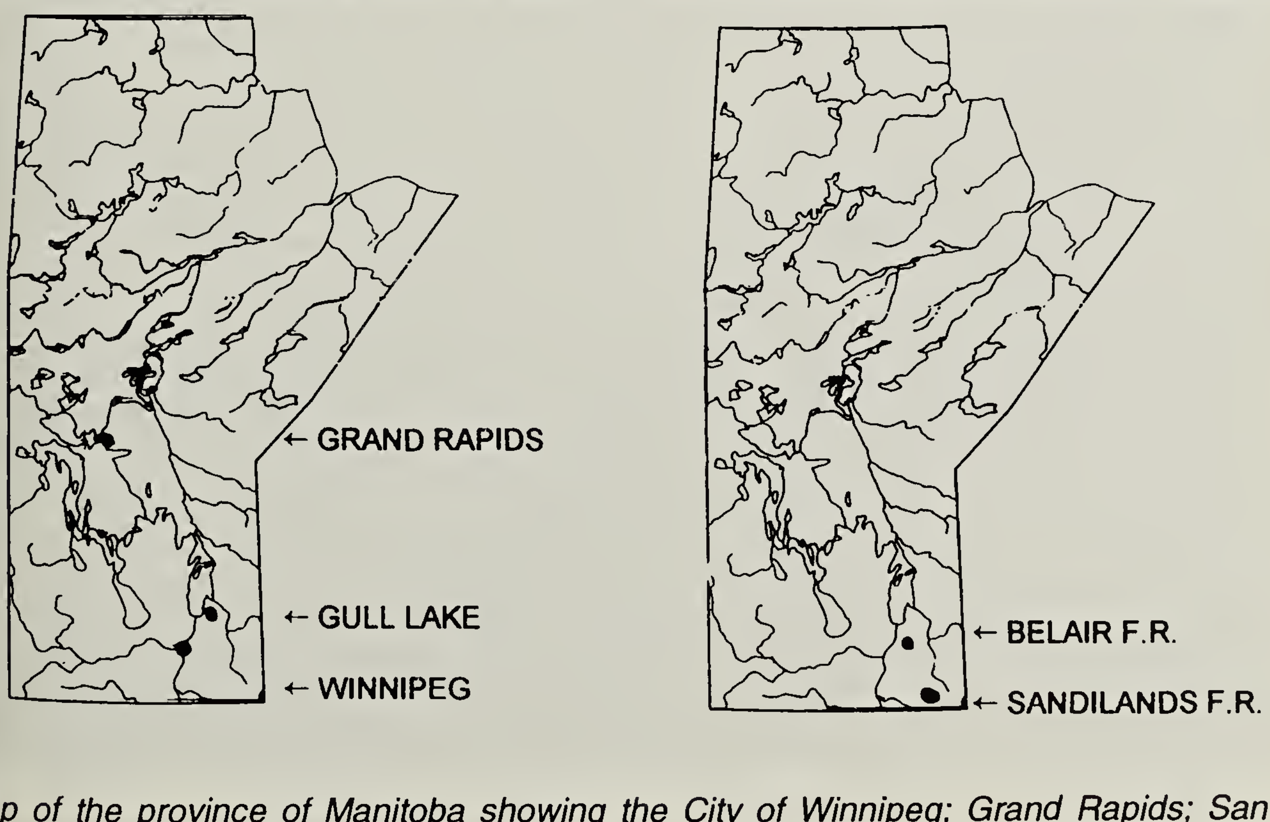
It was possible to accurately determine the age of single plants within this genus by counting growth rings on the rhizome and adding an average of five years for seedling growth. In Stemless Lady's Slipper *(C. acaule)* and Ram's head Lady's Slipper *(C. arietinum)* the stems remain attached to the rhizome for a number of years, making age determination relatively easy. If no stems present, rings will be found along the rhizome which represent them. This technique was used on plants observed in the field for 20 years and proved to be an accurate way of determining the plant's age.

Using this technique the author was able to determine that a large number of Yellow Lady's Slipper (*C. calceolus var. parviflorum*) germinated over a large area including Belair, Sandilands and Agassiz Forest Reserves and Gull Lake, 30 years ago.

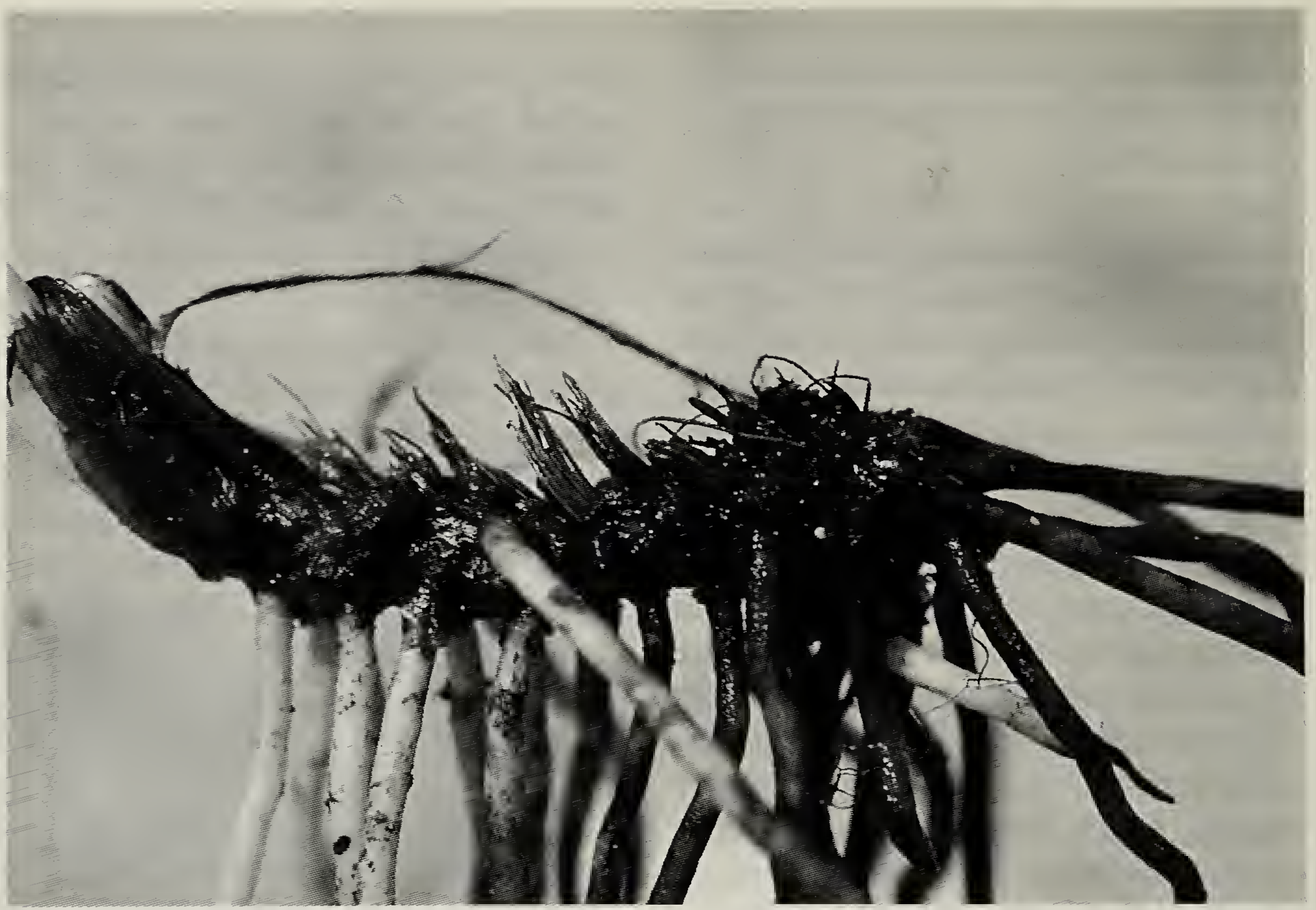
The Yellow Lady's Slipper found growing in a spruce-poplar forest complex, was monitored over a 15-year period. During that time, all of the plants grew only single stems. Two plants were removed and planted in a location affording more light. Within four years, one plant produced five stems while the second plant had six.

Many attempts have been undertaken to save orchids threatened either by man-made or natural disturbances. To date these attempts have met with mixed results. The author has been able to consistently transplant orchids with excellent survival rates.

To determine how well orchids could be transplanted and the optimum period for transplanting, a small experiment was conducted in 1983, in an area slated for clear-cut logging



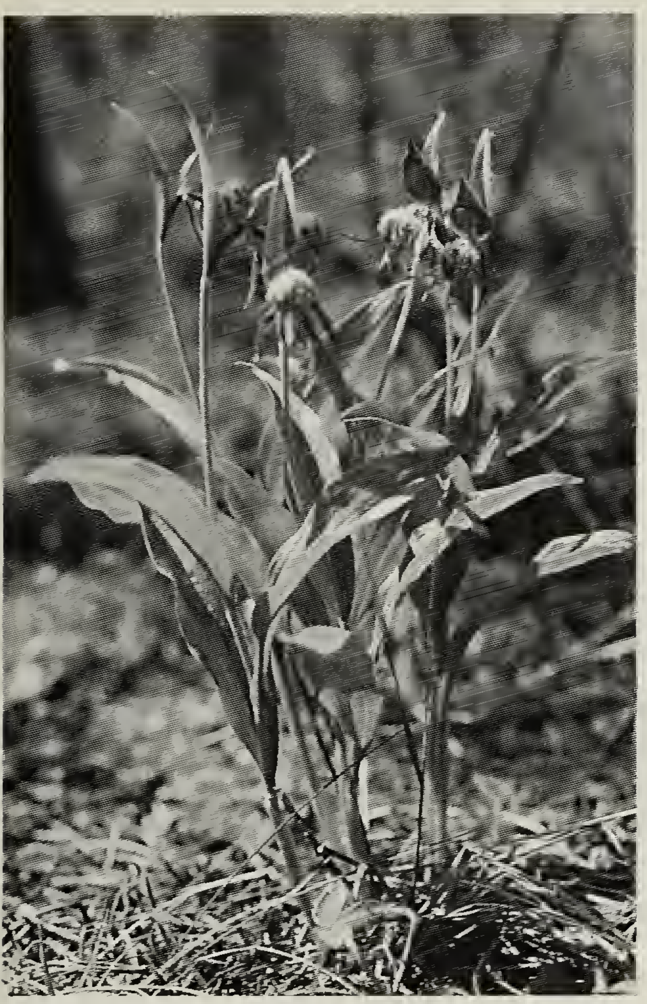
Map of the province of Manitoba showing the City of Winnipeg; Grand Rapids; Sandilands and Belair Forest Reserves; and Gull Lake.



Roots and stems on the rhizome of Cypripedium acaule. *Photographed at Belair Forest Reserve.*

in the Belair Forest Reserve. Over an eight-week period, during July and August, two plants were removed each week and placed in a safe, similar habitat. The plants were watered weekly during this period, except for the last two plants which received only one watering at the time of transplanting.

Similar rhizome to above photograph.



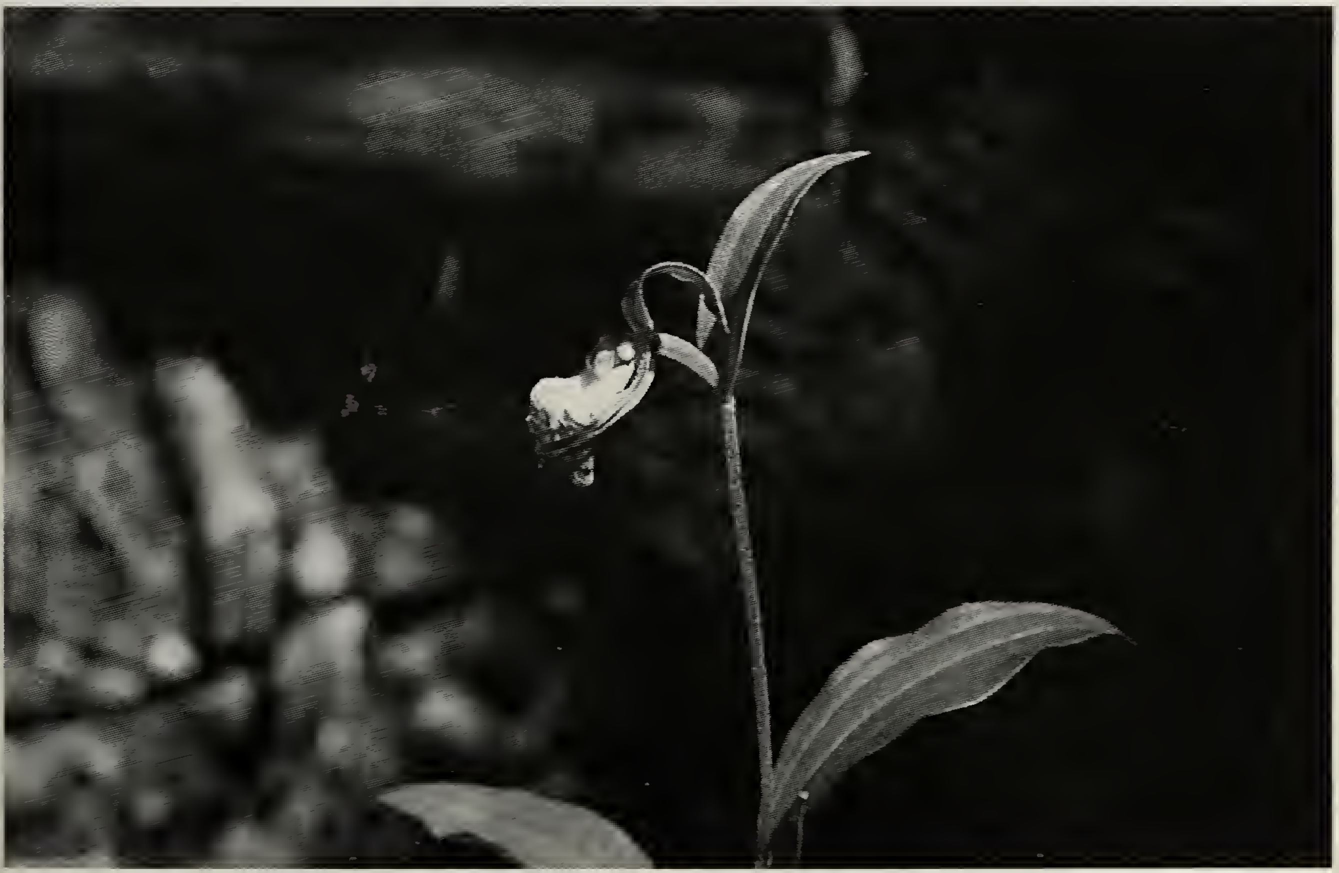
Clumps of Cypripedium arietinum *photographed near grand Rapids, Manitoba.*

The following spring, only two plants had died — the two from the final transplanting which had received a single watering. The rest seemed to have transplanted well. The conclusions were that native orchids could be successfully transplanted during the peak growing season, after flowering had occurred, if adequate moisture was available.

Field trips were also made to the Grand Rapids area in central Manitoba, from 1985-1992. Here it was noted the Ram's head Lady's Slipper grew in clumps which is quite different from south eastern Manitoba, where they grew as single stems.

How old can an orchid get? The authors know of a single Yellow Lady's Slipper *(C. calceolus (L.) var. pubescens)* that was pulled up by the roots by a seven-year old boy, as a gift for his mother. The orchid was planted in the garden and has grown successfully for the past 50 years. Allowing for the seedling growth period, this plant is probably around 60 years old.

- BUD EWACHA and GERRY OLIVER, 35 St. Michael Road, Winnipeg, MB R2M 2K7



Single growths of Cypripedium arietinum *photographed near Gull Lake, Manitoba.*

THE DEMISE OF THE DOMESTIC GANDER

Birds of the Elbow by J. Frank Roy contains a story about a domestic Toulouse X Brown Chinese gander that for eight years helped a pair of Canada Geese raise their young on my farm. In the spring of 1996 this gander was killed in a rather unorthodox way I will try to describe.

Just at dusk on 14 April while doing my chores I noticed a female domestic goose coming to the corrals from a southerly direction. She walked painfully and slowly, her head and neck red with blood. I picked her up and put her in a pen, but when I checked an hour later, she had died. Counting the remaining geese, I found that two more were missing from the flock.

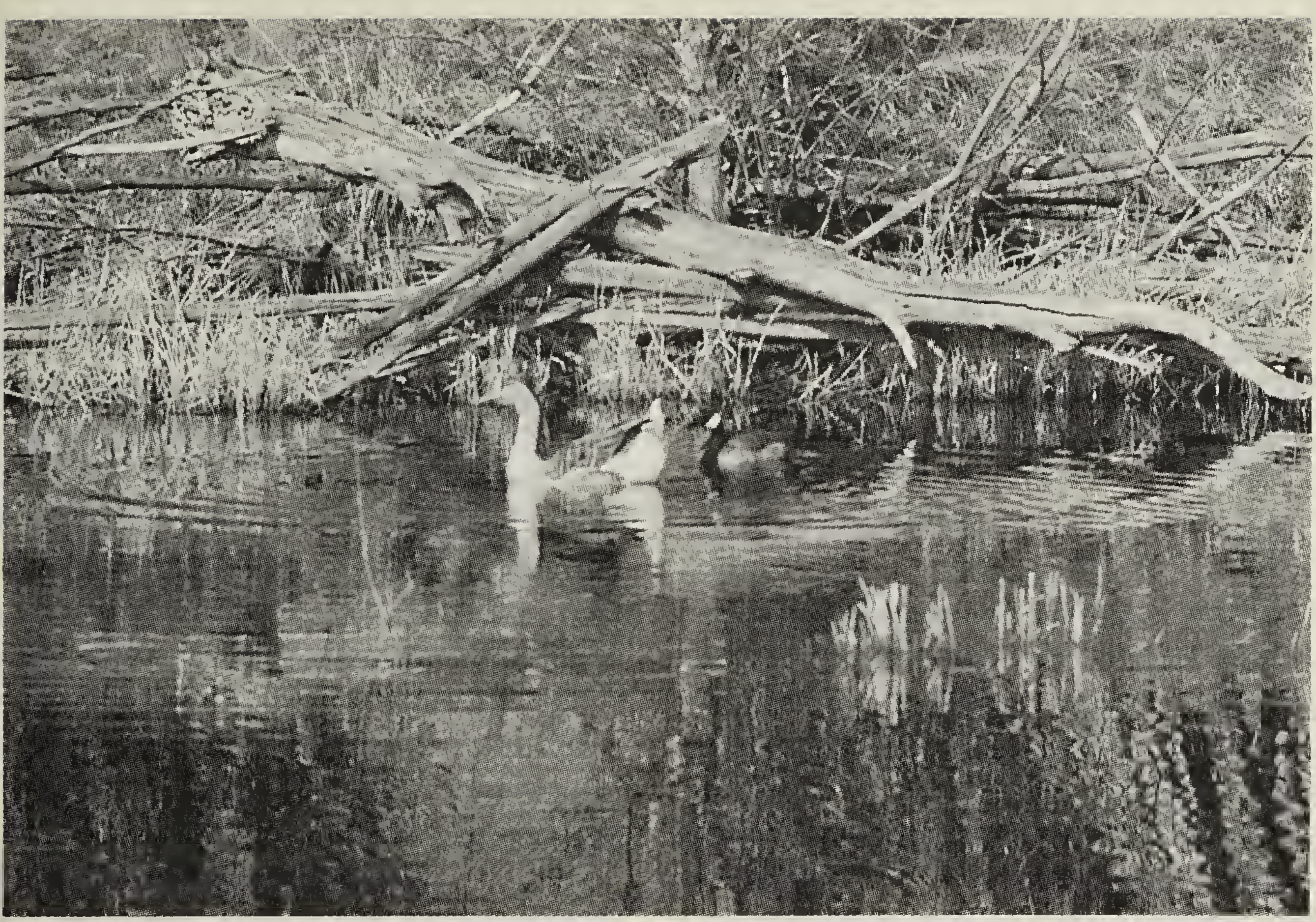
Next morning, at daybreak, I walked south in the direction the goose had come from, and found the spot where coyotes or foxes had ambushed the geese, some 200 yards from the barn in a stubble field behind a shelterbelt. The only signs were feathers strewn about. Across the fence was a bare summerfallow field, where signs of a goose being dragged were quite visible, together with the footprints of a coyote or fox. The track soon reached grassland and was no longer visible. At the bottom of a nearby draw was an ice-covered dam; on it lay a goose, obviously still alive, its head and neck covered with blood.

Uncertain whether the ice would be safe to walk upon, I decided to leave the goose for the time being and went home for breakfast. Later, I returned to the dam. By then the goose had moved over near the north shore and I managed to head it in the direction of home. I recognized him now as the gander that associated with the Canadas.

He had trouble seeing out of one eye but was not hard to get to the barn, where I captured him and examined his wounds. There were punctures in the head and neck, as with the female that had died, a bare spot the size of a dime on his skull, and one eye clouded with matter. I first contemplated putting him down, but he took readily to food and water offered him, so I put him in a box stall. He recovered quite well, even to seeing with both eyes, and three weeks later I released him.

By this time the pair of Canadas that he always associated with had returned from the south and the female was spending most of her time on the nest. Wasting no time with the other domestic geese in the farmyard, the gander soon joined the wild pair. He and the Canada gander generally swam side by side. When I brought grain down each morning, the domestic goose would come to meet me, the Canada not far behind. The two would stand side by side while feeding.

On the morning of 11 May I again brought food down. The Canada was at the north end of the dam and the domestic at the south end. It was the same the next morning, with neither coming to feed. There had apparently been a rift in their friendship. That day, the domestic came up to the farmyard where my son Darryl saw and heard domestic ganders having a battle. When I went over to where they had fought, I found the domestic goose lying dead. The bare spot on his skull was now the size of a quarter and I wondered if a blow on the head could have killed him. Ganders fight by grabbing their opponent



Canada geese share pond with domestic goose *Sig Jordheim*

with their bill and then striking with their wings.

Later in the spring, we found the remains of the second missing goose in a field shelterbelt half a mile north of the farmyard. I had thought originally that the drag marks seen earlier were those of the second goose, but a search of the pasture

Domestic goose with Canada geese *Sig Jordheim* had revealed no traces of the bird. Apparently the drag marks were those of the gander, but it seemed impossible that a coyote or fox could capture a goose, drag it for 100 yards or more, and then let it get away on the ice of a dam, which would safely hold up an animal. The only explanation I can give is that our dog Shep must have heard the commotion and driven the predator away. He is ever watchful of coyotes and foxes and even pursues hawks and owls when they come close. On one occasion he chased foxes away after they had injured two geese. Another time a fox had captured a turkey gobbler, torn out a mass of feathers and injured it so badly it had to be destroyed; tracks in the snow showed the fox had fled in haste.

- SIG JORDHEIM, P.O. Box 544, Kyle, SK S0L 1T0

COURTSHIP BEHAVIOUR OF A PAIR OF BLACK-BILLED MAGPIES

On 2 March 1997, a cloudy, but bright, windless day, I had left Moose Jaw, Saskatchewan, about 4 p.m. and at the Hwy. #1 sign permitting motorists a speed of 100 kph, I set the cruise control when that speed was reached. I maintained that speed when I reached the start of the area which, many years ago, was separate sand and gravel pits. My odometer read 1.8 k when I arrived at the point where the road levelled off, as it had climbed a little. At the same time I saw, almost straight ahead, but somewhat to my right and, perhaps, ten or twelve feet in the air, two Black-billed Magpies *(Pica pica)*, performing the strangest rites I have ever seen.

The two birds were facing each other, only a few inches apart, upright, with their wings beating slowly, just sufficient to keep them airborne, and their tails were fanned. Their bills were open, but I could not hear anything as the car windows were closed. Because of their relative position to me, I was able to maintain speed, steer properly and still keep my eyes on the birds, so I know that they continued this nuptial performance until I passed them. I watched them for half a minute, maybe 45 seconds. The birds were so engrossed with each other that they took no notice of the car.

In my opinion, their behaviour could have only one possible result - copulation.

I described the above to my friend, Fred Lahrman, retired employee of the Royal Saskatchewan Museum in Regina, who told me that he owned a copy of Arthur Cleveland Bent's "Life Histories of North American Crows, Jays and Titmice" (1947) when I had coffee with him on 4 March. Next day, he told me that the Magpie's courtship behaviour had been seen and described only in "bits and pieces." He emphasized that was how it was described when I questioned the phrase.

I offer the above as the complete performance.

Footnote: On Monday, 5 March 1990, a cold (15°F at 7:00 a.m.) bright day I walked, after breakfast, in Wascana, where I saw five Magpies, one of which actually sang an attractive, melodious warble. Fred Lahrman told me that he, too, has heard them sing.

- FRANK H. BRAZIER, 2657 Cameron Street, Regina, SK S4T 2W5

MAGPIES AND AN OWL

On 21 December 1996 we discovered a Great Gray Owl a few kilometres north of Saskatoon. This bird stayed in the same locality until at least 15 January 1997, so I was able to see the bird on several occasions. It frequented the north side of Lutheran Road between the Loraas Landfill and a commercial development. A riding school, surrounded by rough vegetation and low bushes, occupied the centre of this area. The nearby dump held a large population of Black-billed Magpies, which used a small bluff in the northwest corner of the owl's territory as a roost site. Frequently, the owl was attended by two silent magpies as the owl hunted or perched. When the owl flew they followed it, when it perched, they perched nearby and waited quietly. Generally they sat on either side and lightly above the head of the owl, about one metre away. Each time the owl flew, the magpies would follow. When the owl was sitting, it swung its head back and forth listening for prey. The magpies did not appear to pay much attention, but immediately followed it when it flew. This was very different behaviour from that I have noted with other corvids and owls. In eastern Canada, American Crows and Blue Jays will go into a screaming frenzy over Barred or Great Horned Owls. I have also seen many Great Grays in the east, well out of the magpies' range, so I could not observe the interaction of these species before. On reflection though, I do not recall any of the eastern Great Grays being mobbed by any bird, although other observers report such harassment. Does this mean that magpies know that the Great Gray is not a threat? I have only seen these owls catch "mice" and any pellet I have examined contained only small rodent bones. The scientific literature records that the diet is around 90% small rodents. So what were the magpies doing? Were they waiting for the owl to flush something for them or hoping to steal the big bird's catch?

- ROY JOHN, 754 Woodpark Road S.W., Calgary, AB T2W 2S4

Editor's Note

A recent article in the Royal Society for the Protection of Birds magazine *Birds* examined the influence of Sparrowhawks on small bird populations. The Sparrowhawk (*Accipter nisus)* is the ecological equivalent — similar in colour, size and habits — to our Sharp-shinned Hawk *(Accipter striatus).* The authors, Professors Ian Newton and Chris Perrins, reviewed data collected for two song bird studies. One has been run since 1947 and looked at two types of European chickadee, Blue Tit and Great Tit. The other ran from 1949 to 1979 and studied all the local woodland song birds, 13 species in all. During these studies there was a period, from 1960 to 1972, when the Sparrowhawk all but died out. A conservation effort has resulted in the recovery of the hawk to something like its former levels. The authors were able to compare the periods when the Sparrowhawk was present, absent and present again on consistent population data of its prey species. The plots of population of each of the species with time shows some increased, some decreased, but most stayed the same. A few changes could be related to factors like weather, but most matched the changes in farming practices. None of the variations in population level could be correlated with the presence of the hawk.

STUART HOUSTON ECOLOGY CENTRE

In recognition of Stuart Houston's worthy contributions and accomplishments an education centre was established this spring at Redberry Lake to study the pelicans that nest on the lake. The centre is named the Stuart Houston Ecology Centre and the official opening took place on Thursday, 15 May 1997. The Centre is located beside Redberry Regional Park (take Highway 40 west of Blaine Lake).

POETRY

HAIKUS

those twilight
pegs on the clothesline?
swallows

in rain-rinsed twilight
a motionless toad
claims the walk

drifting flakes
distant geese
nothing else

bared to sky now
abandoned
the nest of a hawk

crow in his elm
and I in this attic watching
the first snow fall

- MARIANNE B. NEILY, 124 Clarendon Ave., Ottawa, ON K1Y 0R3

(Editor's note: "Haikus" are Japanese image poems of three lines with 5,7,5 syllables. They are meant to give a clear picture that arouses an emotion, often with a contrast.)

Mating dragonflies, Clearwater Lake Provincial Park *R.A. Mitchel*

NATURE LIBRARY

THE GARTER SNAKES: EVOLUTION AND ECOLOGY

DOUGLAS A. ROSSMAN, NEIL B. FORD, and RICHARD A. SEIGEL. 1996. Volume 2 in the Animal Natural History Series, University of Oklahoma Press, Norman, Oklahoma. xx + 331 pp. illus. U.S. $65.00

This is a state-of-the art summary volume, the first in 88 years, which includes all currently recognized species for the genus *Thamnophis*, the conspicuous, checkered and often brightly logitudinally striped and abundant garter and ribbon snakes. The combined range of the 30 species covered here spans the North American continent from Atlantic to Pacific oceans, north to Fort Smith in Canada's Northwest Territories, and south to Costa Rica. Twenty species are monotypic, but the 10 polytypic species contain 46 subspecies to total together 66 recognized forms. The most variable is the Common Garter Snake, *Thamnophis sirtalis*, which is subdivided into 11 races; five which occur in Canada (Maritime Provinces to British Columbia: *T.s. pallidula, T.s. sirtalis, T.s. parietalis, T.s. fitchi. T.s. pickeringii*). Five other species range into Canada (each represented by only one form here): *Thamnophis butleri* (Ontario), *T. elegans* (*T.e. vagrans*; Saskatchewan to British Columbia), *T. ordinoides* (British Columbia); *T. radix* (no subspecies now recognized; Manitoba to Alberta); *T. sauritus (T.s. septentrionalis);* Nova Scotia and Ontario.

Sixty-year old Douglas Rossman is widely recognized as the world authority on the taxonomy of *Thamnophis*. Twenty of his contributions, the earliest from 1962, are included in the 41-page Literature Cited. Ford and Seigel have had shorter careers, but are also widely recognized for their prolific research and synthesis contributions to behaviour and ecology of snakes, This makes the collaboration both logical and fortunate.

The authors have partitioned the book according to their interests. The first section is on Taxonomy and Evolution and contains three chapters, all by Rossman, on (1) Taxonomy and Relationships of Garter Snakes, (2) Chronological Lists of the New Genus, Species, and Subspecies Names Proposed of Garter Snakes, (3) Key to the Species and Subspecies of *Thamnophis*. The second is on Ecology, Behaviour, and Captive Care and also contains Three chapters (4) Ecology and Conservation of Garter Snakes: Masters of Plasticity by Siegel; (5) Behaviour of Garter Snakes and (6) Care in Captivity both by Ford. The third and concluding section is Species Accounts. Each contains a synonymy, and sections on Identification, Content, and Distribution, Description, Taxonomic Contents, Life History and Ecology (Habitat, Activity, Feeding, Reproduction, Population Biology, Captive Maintenance, Conservation). These accounts are jointly written by all three authors. Although the coverage throughout the book is current, it relies on what has already been published and disappointingly lacks new synthesis of such ongoing topics as evolution, intraspecific variation, and zoogeography within the genus. There is, however, a lot of "staking out" of research territory with statements on what is currently under investigation, particularly by Rossman and his students.

Although there is a map for each species, the ranges are depicted by patches of cross-hatching, not dots of individual localities as would have been expected in a reference book. Some very strange interpretations are featured in some Canadian ranges, especially disjunctions in the northern ranges of Common and Wandering Garter Snakes in Western Canada. These are more likely due to inadequate surveys than actual gaps in distribution, but there is no documentation of map data sources. A central section (placed between pages 188 and 189) consists of colour photographs of every species — 14 plates contain six pictures each, and a final plate contains a single outsized habitat shot and three pictures of a feeding snake, a fed snake, and snake food. The individual snake photographs show the variation both between and within species but are disappointingly tiny in comparison to the one that dominates the dust jacket. There are 31 black-and-white figures scattered through the first two sections, of diagrams, graphs, and sketches, and one photo of a walkway to observe feeding behaviour. There is a very useful four-page glossary of terms used.

The significant contributions that Canadians and Canadian populations have made to our knowledge of garter snakes is evident in text and references, particularly on the now famous interlake *T. sirtalis parietalis* populations north of Winnipeg in Manitoba where work was initiated by Kenneth Stewart, M. Aleksiuk, Pat Gregory, Tom Vincent, Don Hart (and by the latter also on *T. radix);* on Vancouver Island and mainland populations of *T. ordinoides, T. elegans*, and *T. sirtalis* by Gregory and his many students including R.J Douwens, A.G.D. McIntosh, J. Macartney, D.H. Ricard, K.J. Nelson, C.J. Prelypchan; on Northwest Territory and northern Alberta populations of *T.s. parietalis* by Gregory and K.W. Larsen; on southern Ontario *T. butleri* by Paul Catling and Bill Freedman; on melanistic *T. sirtalis* by A. Gibson and Bruce Falls, and zoogeography and variation in eastern Canadian *T. sirtalis* by J. Sherman Bleakney.

Given the prominent place of the genus *Thamnophis* in North American ecosystems, and its ubiquitous occurrence from here into Central America, this book will find a wide audience, not just among naturalists and researchers but also the rapidly expanding herpetoculturalists. This genus is popular with the latter group because of colourful and varied patterns and comparative ease of care. The abundant forms in this group may be suitable alternative captives, for those who must keep captives, to rarer reptiles. They also have the benefit of the existence of already thriving captive bred lines which negate the need to remove additional individuals from the wild. In Canada, as individual provinces may require permits to collect or keep some species, local natural resource agencies should first be consulted.

- Reviewed by *Francis R. Cook*, RR3, North Augusta, ON K0G 1R0

(Editor's note: Dr. Francis Cook is editor of the Canadian Field Naturalist, *a refereed scientific journal published by the Ottawa Field Naturalists. Dr. Cook was the Dominion Herpetologist at the National Museum until his retirement.)*

DEEP ECOLOGY FOR THE 21ST CENTURY: Readings on the Philosophy and Practice of the New Environmentalism.

George Sessions, editor. Shambhala Publications Inc., Boston & London. 1995. 488 pages. $42.00

This book contains 39 articles by 21 of the leading authors and thinkers within the new environmental movement that emerged during the 1980s. It has six parts.

Part one asks, what is deep ecology? There are ten articles in this part, one of which is by Gary Snyder and another by Arne Naess who are among the deepest of the thinkers, and who contributed other articles throughout the book. Naess says that deep ecology arose from deep thoughts and goes beyond concerns about resources, waste and conservation; although, these are essential to the total movement. Deep ecology delves into the nature of man and the duality common in Western Civilization. This duality separates man and nature as being distinct from one another, and the consequences of this for the earth have been disastrous.

In part two, the history of ecological thinking is traced, beginning with people like Thoreau, Muir and Leapold, and then the surge that took place after World War II, particularly in the 1960s. In the 1980s deep ecology added something of another dimension to the environmental movement by questioning our self-indulgence, homocentricism, as opposed to ecocentricism, which includes all life and its support systems. We need a paradigm shift to place ourselves within nature, not separate from it. Nature and humans must exist as a unit; nature must not be seen as a separate set of commodities merely for human use or enjoyment.

Part three contains an introduction and nine articles, eight of which are written by Arne Naess. Ecology is the science of connected relationships in nature, relationships necessary to the existence of life. Naess, a Norwegian and former head of philosophy at Oslo University, takes this connectedness to a level including philosophy and psychology — a way of living. He says that the goal in life is self-realization — the realization that self includes nature. When this expanded self includes the whole of nature, one achieves full self-realization, and we are united with that on which our life depends. He insists that this is the starting point if the earth is to be restored and saved from the ecological crisis wrought by humans.

He goes on to quote Eric Fromm, who said that self-love, not selfishness, is necessary to psychological health. Fromm's self-love is the equivalent of self-esteem, about which we now hear so much. And Fromm said that love entails knowledge, care, respect and responsibility. With a new understanding of self, care of the earth becomes care of self and does not come from a sense of duty but arises out of love for that which is part of our being. God is not seen as transcendant but as immanent in all things — all things are sacred.

Naess, and other authors point out that the above kind of thinking is more common to Eastern and North American Indian cultures than it is to Western culture. In the West, where man has been separated from nature, nature has been looked on as the enemy to be conquered, dominated and used. Also, some western

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